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Vol. IX. [New Series.] No. 2.
[VOL. 1.]

THE
KANSAS CITY REVIEW.

STORAGE

SEPTEMBER, 1885.

THEO. S. CASE, M. D.,
WARREN WATSON, } EDITORS.

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HISTORICAL SKETCH OF THE ARYAN TONGUES. Prof. L. Wiener.

HERBERT SPENCER'S ESSAY ON RELIGION—A CRITICISM. Nathan C. Kouns, author of *Arius the Libyan*, *Dorcas*, *Faustina*, *etc.*

THE CRADLE OF THE HUMAN RACE. Edwin Coombs (a review of Dr. Warren's book, "Paradise Found").

SONG NOTES OF THE PERIODICAL CICADA. Prof. C. V. Riley (Read before the A. A. A. S. at Ann Arbor).

LIFE IN UNCONSCIOUSNESS. Frederick Hartman.

A CHINESE COLUMBUS (*concluded*) etc., etc.

THE KANSAS CITY REVIEW

SIXTY-FOUR PAGES OCTAVO, MONTHLY,

Is published on the first of each month. Books or exchanges to be noticed promptly, should reach the editor by the 20th of the previous month at the least.

$2.50 Per Annum, Post Paid. Single Numbers 25 Cents.

Edited by THEO. S. CASE and WARREN WATSON.

All communications should be addressed to

WARREN WATSON,
1319 Broadway, Kansas City, Mo.

WORDS OF PRAISE

A considerable degree of pleasure was experienced a week or so ago when the REVIEW made its appearance in my mail. I had frequently expressed regret that its publication had been suspended—I feared it was a thing of the past. I enclose you a dollar to pay till New Year and hope it may *never die again*.

Yours etc., T. BERRY SMITH,
Professor of Chemistry, Pritchett Institute, Glasgow, Mo.

The KANSAS CITY REVIEW OF SCIENCE AND INDUSTRY has been changed to the more simple and appropriate KANSAS CITY REVIEW, T. S. Case, M. D., and Warren Watson, editors. It is a live exponent of the scientific and industrial interests of the West.—*Iron Trade Review.*

The publication of the KANSAS CITY REVIEW OF SCIENCE AND INDUSTRY has been resumed. The name has been abbreviated to the KANSAS CITY REVIEW, which is an improvement, as the former name was rather cumbersome. The first number of the new series, which is at hand, offers a very interesting, instructive and entertaining table of contents. The student, the scientist and the general reader will find much that is valuable in the contributions which make up the offerings of this number, which, we are informed, is but the forerunner of even better ones to follow. The names of Dr. Theo. S. Case and of Mr. Warren Watson as editors are a sufficient guarantee that the high standard of this magazine will be maintained. We commend it to all lovers of good literature and wish it unbounded success.—*Jefferson City Tribune.*

The September number of the KANSAS CITY REVIEW will be out this week. A glance at the well-filled pages of this off-spring of Western thought and enterprise must convince the most casual observer that it is decidedly the most entertaining number yet put to press. "The Beginnings of Language," "Early Stages of the Earth's Growth," "Death in Life," "A Chinese Columbus," "Wonderful Productions of the Ocean," "The French Academy," "A Fish Eating Plant," and "Our Consular Service," are among the most interesting of the articles. A meteorological report for August is given. The editorial department, unlike that in most magazines, is lively and spirited, each subject being handled in a fresh and attractive manner. Under head of "Scientific and Industrial notes," a whole volume of important and useful information is given. Those of the Sentinel readers who are not subscribers to this valuable periodical should become so, and while securing for themselves a valuable Western magazine, aid an enterprise that deserves their support.—*Independence Sentinel.*

We commend Col. Case for his determination to shorten the name of his instructive magazine to the KANSAS CITY REVIEW.—*Kansas City Times.*

THE KANSAS CITY REVIEW,

DEVOTED TO

Science, The Arts, Industry and Literature.

VOL. IX. SEPTEMBER, 1885. NO. 2.

THE BEGINNINGS OF LANGUAGE.*

The art of conveying conceptions, or impressions, from one consciousness to another, by vocal utterances, has its origin so far removed from the possibility of exact investigation that students cannot aspire to settle definitely the disputes that arise in every examination of the subject. From one point of view the genesis of spoken language was a miracle; and if this be the correct opinion there is little matter left for controversy, which would become, for the most part, mere logomachy. But if we examine the matter from a naturalistic standpoint many interesting questions and lines of research present themselves; and, as the discussion of the subject can be more easily approached on this side, it may be conceded, for the time, that vocal speech, like other arts, arose by slow, but progressive, steps from almost imperceptible beginnings. In fact this art is not confined to the human family. We know that many animals can convey by means of vocal sounds, well defined ideas which are recognized and responded to by their fellows. Who has not noticed the numerous modulations and inflections in the voice of a favorite dog? And who could fail to distinguish the bark of welcome from the bark of defiance? Brehm, the German traveler, says: "It cannot be denied that the voice * * * * of the Chimpanzee is a formal language. All the sounds are fully accentuated, and the observer soon understands the meaning of the different modulations, while children, playing with the animal, catch at once the sense of its utterances." Of course this observer did not mean that the language of the Chimpanzee is capable of syntax, or even of a vocabulary; yet it is a "formal language" in that it serves to express the animal's wants and moods. Even the cries of fowls and the larger domestic animals show their capacity to translate the rude concepts of the animal soul to other beasts and to man; while the researches of Sir John Lubbock establish the truth of Huber's statement that ants can converse by means of their antennæ.

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*Read before the Query Club.

But it must not be supposed that spoken language is instinctive in man or the lower animals. In truth even the songs of birds must be learned from contact with other birds, for, while the tendency to sing may exist, "the particular notes, or succession of notes," can only be acquired by imitation. The Tyrolese have taught their canary birds "a peculiar song and this they now transmit to their offspring." The bark of domestic dogs is an acquirement—wild dogs do not bark and by some it is supposed to be an attempt to imitate the human voice. Indeed it may be said that the progress of spoken language in animals is only limited by the form of the vocal apparatus and the functional development of the brain.

The relation between the cerebral centers and the mechanism of vocal speech is difficult to examine in its early stages. The infinitely complex arrangements of vocal chords, lips, teeth, palate, tongue and the multitude of muscles governing them, together with the management of the breath and facial expression, must be co-ordinated, through the cerebral activities; and it would be extremely interesting to trace out the history of the synchronous development of brain convolutions and the capacity to use vocal speech. But this department of enquiry is not yet in a condition to admit of any very useful observations. Suffice to say that an advance made on either side would tend to produce corresponding progress on the other. At any rate the recent experiments of Ferrier, and other vivisectionists, have shown that portions of the cerebral cortex bear a direct relation to speech; and that as one and another of these portions are removed, the power of vocal utterance is more and more limited, and finally destroyed. I might refer, also, to numerous cases of aphasia, accompanied by lesions in the cortical substance; but enough has been said to show that physiological development was an important factor in the beginnings of language.

Mr. Darwin has suggested that the first step in the formation of language might have been the imitation, by some anthropomorphous animal, of the "growl of a beast of prey" as a warning to his mates of the "nature of the expected danger." This suggestion is in line with what has been called the "bow-wow theory" of linguistic origins; a theory, however, which is growing in favor with scholars, notwithstanding the ridicule it met at first from eminent philologists. According to the views entertained by this school, "language owes its origin to the imitation and modification of various natural sounds, the voices of other animals and man's instinctive cries, aided by signs and gestures." How from such low origins, the wonderful instrument of vocal speech arose to its present perfection and utility can be explained on the physiological ground above referred to and by the tendency toward change and novelty, which characterizes the human species, as well as by the ever increasing circle of acts, events, and things which civilization brings into relation with man. There is no question but that words were invented before connected speech, and that gestures, at first, formed an important element in the communication of emotions, wants, or impressions, from man to man. In fact, it would seem that gestures constituted the primeval verbs and adverbs, and that facial expression played a great part in limiting spoken words. Even now, though we have a "well of English undefiled," to draw from, we eke out our meaning by a thousand movements of the head, limbs, body and facial muscles, or, lacking that power, seem dull and cold to listeners. It is said that pantomime was carried to such perfection amongst the ancients that, not only farces and comedies, but even tragedies, were acted without a spoken word; and this art became so perfect in Rome that such dramas were presented to audiences drawn from all parts of the Empire, composed of Romans, Greeks, Gauls, Germans, Persians, Parthians, Egyptians, Numidians and Jews, who could all follow the incidents of the plot with equal facility. It will be observed that gesture language does not take cognizance of verbal differences. It is obvious that the eye, the hand, the mouth, perform similar services for all races; hence a symbolism, drawn from such objects, and used to transmit ideas between different individuals, forms a universal language which is not concerned with the variations of spoken language. Yet, none the less, it will strongly impress a thoughtful student that spoken language must, *ex necessitate*, have been affected by gesture language very extensively, and must bear imbedded in its strata the fossils which, once discovered, would make the difficulties of the subject less insurmountable. Besides the learned and exhaustive work of Mr. Gatchett there are few books extant that can furnish any assistance to delvers in this field; but there is no doubt that the subject will continue to attract the curiosity of scholars till its difficulties are thoroughly explained.

It goes without saying that writing has nothing to do with the *formation* of language; though it has, undoubtedly, been instrumental in its modification and extension. Even the rudest savages possess a language of spoken words, however meagre: and it must be borne in mind, before despising the trivial vocabularies of savages, that, even in this enlightened nation, there are few day laborers who can repeat three hundred words of their mother-tongue—a tongue which boasts a dictionary of one hundred and fourteen thousand words. "This fact," says Prof. Max Mueller, "simplifies immensely the problem of language." His view is fully borne out by recent researches. It has been discovered that every language is founded upon certain root words, few in number and hard to distinguish, on account of their great antiquity and the consequent changes in their pronunciation. Some of these roots, however, have an easily discernible origin. The names of animals are frequently derived from their cries; as cuckoo, bobolink, hoopoo, etc. Such words as bang, crack, purr, whiz, hum, etc., seem to be attempts to characterize the sounds they represent. Thus, also, of the inarticulate sounds of the human voice; such as those expressed by the terms moan, groan, sigh, cough, sneeze, yawn, halloo, etc.; those of animals simulated by cackle, gobble, twitter, mew, yelp, roar, croak, etc.; words expressing the collision of hard bodies, rap, tap, snap, slap, crack, smack, whack, pat, batter, beat, etc.; the sense impressions expressed by clash, smash, crash, splash, clang, ring, bump, thump, boom, hum, hiss, rustle, whistle, whisper, murmur, whir, puff, fly, flit, flow, flutter, patter, crackle, bubble, rush, etc. From characteristic, but inarticulate expressions of the emotions we get a number of words like woe, ache, etc.; from O! Ah! Ugly, hugh, huffy, from the guttural ugh! etc., etc. It is true such words form but a small part of the vocabulary of a language and, admitting that in-so-far as we detect such probabilities of origin we can trace a word to its original root, yet there are large classes of ideas which are seemingly not expressible by sounds either directly or by analogy. But even here the difficulties are not insuperable. Take the word "heart," for instance, whose etymology discloses that it is the descendant of a root word "hrad," which attempted to reproduce the throbbing sound of the heart-beat; and "foot," from the root "pad," evidently an attempt to give the sound of a foot-fall; and "daughter," from the root "dhugh," to milk, (the milker) probably onomatopoetic for the sound made by the gushing milk in the pail. These are mere guesses of course, and it is quite likely they are incorrect, but the point can be illustrated by them just as well as if they were entirely apposite. Suppose the primitive man wished to describe some carnivorous animal: the most salient characteristic to him would be the savage growl, and this, imitated, might become the name of the beast. But the matter would not end there. From this newly coined substantive adjectives, adverbs and verbs would be formed *ad libitum*. Our noun "dog" has given us, as an example, the adjectives "dogged" and "doggedness," the adverb, "doggedly" and the verb "to dog"—all of them far removed from the root-word, which, probably, was merely an attempt to reproduce the snarl of the animal named.

Many such examples could be given but, in the end, they would only emphasize the point without strengthening it.

These instances give rise, however, to another reflection. It is apparent from them that the real thing apprehended by the primitive man most clearly was the qualities or characteristics of surrounding objects. It is this fact which accounts for the universality and homogeneity of sign language before alluded to, and may account for the striking similarity of occasional words among widely scattered nations. The sound of the wind among the trees, the patter of rain-drops, the surge of ocean billows, the ripple of flowing water as well as the cries of birds and animals, would be phonetically similar whether reproduced by the human voice in China or Peru. The deduction is too obvious to dwell upon.

It has been contended that the steps by which an infant advances to a knowledge of language, reproduce the stages which, respectively, presented themselves to primitive man. This contention is correct in one sense at least, for whatever might have been the actual process, there is little doubt that the language of each race furnishes many evidences of a growth from the simple to the complex. An infant, in its first instinctive efforts to use its voice, gives utterance to a meaningless gabble which cannot be considered as even incipient speech. It is not an attempt to express its wants and bears no more resemblance to language than the sound of the wind in an Æolian harp does to true music. Both come from the insensate side of nature. But there is a difference between them. The wind might breathe upon the strings of the harp forever without producing any thing better than the wild chords its first zephyr had aroused; while the intelligence of the child observing the effect of the sounds automatically produced by its vocal apparatus, would strive to reproduce them consciously and would thus form the nebulæ of language. The intellect of an infant, like that of the lower races of man, though in an embryonic state, is quick to respond to outside impressions. When the discovery is made that its utterances are responded to by certain familiar objects which are always in its vicinity, the child begins to associate these objects with the sounds it makes. For instance, one of the first sounds the voice of a child produces is *ba* or *pa*, *da* or *ta* or *ma*, and the result is, that among widely separated people in Africa, Asia, Europe, North and South America, Australia, New Zealand, and the islands of the Pacific, the parental relations are expressed by the above sounds or their modifications or duplications. These primeval germs of language, seemingly so insignificant are really of vast importance, for it is the first steps always which are the most difficult. Having discovered the efficacy of nomenclature the infantile mind is not slow to extend its vocabulary. The record kept by Taine of the linguistic progress of a child is a curious confirmation of this fact.

It is thus that an infant in its first instinctive efforts at vocal speech gives names to its parents and attendants and the objects of its wants. Along with these substantive words would come ideas of quality, of attributes which characterize these various objects. Food is good or bad, nurse is cross or kind, medicine is nasty, etc. Thus it is that the child next gathers a small list of adjectives to help out the few substantives and pronominals at command. Then there enters its dim consciousness another, and a very important impression; that is, that these objects, so named, exist independently of itself and are capable of performing certain actions. This step in mental progress furnishes it with pseud-conceptions which need characterization, verbal identification. This, with the prior experience of the child, is easily accomplished and he is now in possession of the skeleton of language. The next step is to put it together. To do this properly there are other kinds of words to be acquired—viz: prepositions, adverbs, conjunctions, etc. These are not such easy conquests as the others, because, standing by themselves, they have no meaning whatever, and the child can only grasp their office by observing their relation to other words. It is true a sentence can be constructed without these meaningless words: "dog runs," or "black dog runs," are sentences which convey well defined ideas, and both could be easily constructed by the child. But the sentence "black dog runs fast and barks fiercely," is too complex, contains too many meaningless words, to be so readily apprehended or reproduced; yet adverbs are very easily acquired in comparison with prepositions. Indeed many fairly educated men make frequent mistakes in the use of these vexatious little words which are so utterly barren of meaning in themselves, and yet are so potent in fixing the meaning of other words.

That by some such gradational development a child acquires the art of vocal speech will not be questioned; and there is little doubt that primitive man acquired his stock of words and put them together in much the same way.

There is this difference, however, to be noted: the words which the child learns are, for the most part, taught to it by rote; while primitive man was forced to coin the words out of which his sentences were constructed. How, then, did these meaningless words first come into existence?

In carrying out the linguistic development of a child we have outrun the development of primitive speech. We have talked of substantives, pronouns, verbs, etc., while in truth there is every reason to believe that in the earliest language each word might fill the office of the various parts of speech interchangeably. In the Chinese language such is the case even now, and it is true also of several other languages. In this stage of development all the words of a language must have had well defined meanings, and only became prepositions, adverbs, etc., from the relation in which they stood to other words. This is not all speculation. We have traces even in so old a speech as our own of the growth of meaningless from significative words. Thus our preposition "from," originated in a primitive Aryan verb, meaning, "to go through," or cross, while the conjunction "and," came to us as an int. verb, (and was used as such by Shakespeare,) and "the" came into our speech as a relative pronoun—in fact the pronoun for all genders which we now lack, and need so much. Many instances of this kind could be adduced; but by far the larger part of the meaningless words in our language baffle the acutest enquiry into their origin. From the few known derivations, however, we are enabled to guess the mode in which many words of this kind originated.

It is stated above that language has been traced back to comparatively few root-forms; and when we are told further that these root forms are all monosyllabic we can see that the primitive speech of man was composed of words of one syllable like the language of the Chinese and of the Otomi of Mexico. The process of building up polysyllabic words came about by agglutination, which is characteristic of all rude languages. In fact it was this process of agglutination, together with certain vowel changes, which produced the earliest inflections of substantives and verbs. The root-form was usually a consonantal sound or a combination of consonantal sounds. A vowel breathing was given to this, and different shades of meaning were expressed by changes in this breathing.

It was by some such process as above pointed out that man first equipped himself with those sounds which formed the fixed roots of words expressing objects, conditions,, qualities, actions, and derived from them the elaborate material of cultivated speech. Many of such derivatives are the meaningless words before alluded to, which perform such an important office in determining the relation of other words, and which appear in our inflectional forms in an atrophied state; and these inflectional forms now invite our enquiry as to their origin and growth.

It is obvious that the essential idea in the substantive is the object named; in the verb the action verbally characterized. But primitive man would soon find the bare root-words too inelastic to serve his purpose. The relation of different objects to each other, the different modes and successions of action and the varying persons of the actors, would demand recognition and verbal discrimination. If all these different shades of meaning had required the invention of distinct words to express them, language would have become too cumbrous an instrument for the every day uses of man; and there was no tendency in this direction. The natural process of evolution, while it advances from the simple to the complex, does not create or destroy; it simply differentiates and combines. Language was no exception to this law. When the earliest man perceived an object or an event in novel relations, he did not coin a new word to express the phenomena, but took the word already known and added to it the words expressive of the relation. For instance, the phrase "beside the tree" expresses a complex idea in which the element "tree" is subordinate to something which is pointed out by its vicinity. We place the inflectional word before the noun, but the natural way, as shown by the comparison of all languages, is to make it come after the word to be affected. Thus our primitive friend would say "tree beside;" using, however, instead of our preposition, words which to him gave a notion of the relation he wished to express, and which gradually assumed the prepositional form only to lose it again in a case ending. "Beside," for example, is composed of an archaic word "be," meaning *round*, and "side," which originally meant the *edge* or *border* of a thing. Thus "tree beside" would have, at first, a meaning in all its components as above stated.

This is indubitably the mode in which our inflections originated; and the rise of this feature in linguistic growth heralded the approach of the grammar stage of language. It is apparent that so long as speech remains monosyllabic, that is so long as every compound word can be split up into other words, each with a distinct office, rules of grammar are of no utility whatever. But a time comes finally when neither the root or its added elements have distinct meanings; when all of them, taken together as one word, are indispensable to perform the required function. It is at this time that grammatical science becomes necessary and possible. Most all languages are in this condition of growth, at least in the Indo-Germanic, or Aryan family. For, while we have been dissecting modern words to find their atrophied components, it must be borne in mind that much of this is guess work; and it is only the refinement of philology which distinguishes the separate words of the ancient expression among the debris that remains after centuries of use and decay.

We have now reached a position which is properly the last stage in the growth of language; but there is a final principle which calls for a few remarks. After speech has attained the inflectional form a peculiar change tends to come about. To illustrate, take the verb "to be." The earliest form of the *p. t.*, *ind.*, *1st pers.*, is the sanscrit *asmi;* and the consonantal sound—*m*—in that verb, whatever primitive word it may represent, is perceptible in our "am." In the sanscrit word, *as* is the verb, while *mi* is merely a relative pronoun; and thus our verb, singularly enough, has eliminated all phonic fragments of the original verb and retains a single sound only of the pronoun. It follows that when we say "I am," we are simply uttering, according to original meanings, "I, I."

It is hardly necessary to remark that almost all of the stages of growth in primitive languages still occur, even in our finished form of speech, for large bodies of words. And we can easily study their development by condescending to notice the changes, by way of idiom, slang, foreign words, corruptions and provincialisms, which daily occur in colloquial speech. But enough has been said to serve the purpose for which this paper was prepared.

EARLY STAGES IN THE EARTH'S GROWTH.

There are many things in the scientific world that are interesting objects of study and subjects for thought. The most important discoveries in science are known to every well informed person. Many of these discoveries are known like house-hold words. The scientist with his instruments, the merchant in his library, the minister from the pulpit, the farmer at his table, and the woodsman at his cabin door, all discuss momentous subjects, and each astonishes his hearers in the same ratio as their ignorance. The cracker-barrel of the corner grocery is not without its oracle, who settles the questions of Science and Theology before a gaping audience.

Objects of which we are conversant never lose their interest; no matter how many times they are presented before us there are always new points to study, whether it be a trilobite or a horse-shoe crab, a mastodon or the armadillo. We, as students, never tire of old, and are ever anxious to learn new, truths. The geologist's hammer rings just as cheerily as ever, the palæontologist is never weary, and the physicist is persistently trying to forge the one single link which will make his chain complete.

The moon being the nearest orb, (221,590 miles from the earth) let us visit it mentally, and from its surface watch the formation of the earth from its nebulous mass. The *nebular hypothesis* is known to all, and those of us who accept the theory do so owing to its plausibility. Nebulæ is a name that was given to indistinct patches of light in the starry fields. It has been shown that some of these are (1) clusters of stars, or (2) masses of luminous gas or vapor, thereby vindicating Herschel and Laplace.

We are now looking from our eyrie in the moon, upon a mass of gaseous or vaporous nebulæ. This gradually becomes smaller and denser, loses some of its luminosity and begins to borrow splendor from surrounding celestial bodies, assumes a globular form many thousand times larger than the present size of the earth, forms a nucleus of solid matter enveloped by a dark curtain of clouds and chemical vapors. Circumstances prevent our physical gaze from penetrating beneath this curtain, but mentality comes to our aid and we part the clouds, thereby enabling us to see a molten substance which we will call granite. We observe that the clouds, constantly whirled about by tempests, precipitate a primeval rain upon the liquid granite only to be thrown back in masses of vapor. This produces other meteorological disturbances. Storm after storm sweeps across the sphere, tornadoes, cyclones, simoons and hurricanes are striving for mastery over the new born earth, and, neither one gaining supremacy, they all maintain control of some portions of the earth during its life. Every torrent of rain upon the granite, as we can see, chills and disintegrates until it is sufficiently cool to retain metals, and other mineral substances and at length a certain amount of water; thus we have oceans, lakes and rivers composed of the element necessary for sustaining the first life.

In this nebulous mass surrounding our infant world are the elements to produce and maintain life. In it is the germ of wheat, the protoplasm of animal life, the bioplasm of man. This nebulous material contains the dreaded fire-damp and the invigorating oxygen. Within this luminous vapor are the elements which millions of years hence will produce crime and benevolence, sorrow and joy, gentleness, anger, bitterness and sweetness; in fact every potency which supports or destroys life, or makes, or mars man's destiny, is contained in this nebulous mass. We now notice through a rift in the clouds that the waters are rushing along, and torrents of rain are falling, both producing erosion of the igneous rocks. The unequal cooling, denudation and internal disturbances have formed hills, vales and mountains. By the heat of the scarcely cooled surface, coupled with the sun's rays, water is drawn into clouds and precipitated again and again in tempestuous masses, cutting, tearing and washing the primeval rock which is carried along to be deposited in whirlpools and ponds and lagoons, thus making the first stratified rock, called Laurentian in North America, and Pre-Cambrian in Europe. The waters are now less turbulent, and, if we could make an examination, by the aid of a powerful magnifier, animalculæ could be seen, composed of minute calcareous shells chambered or not, containing gelatinous matter. The waters are teeming with *foraminfera* which are termed eozoon. These animals constitute the first life of our world. The waters need not necessarily be cool, for some of the lowest orders of infusorial life can live in warm waters. If extreme evolutionists are correct all future life of the earth sprung from these eozoon, or we might say vitalized mud. These animals, upon their death, would precipitate their shells, thereby making limestone. All the limestone of the earth is made from the shells of animals. The eozoon were so numerous as to produce Laurentian limestone 20,000 feet thick. Lead, copper, baryta, graphite and mica make their appearance in this the second period.

The clouds are drifting lazily away from our field of vision, and we can see the evolution of the third period. The earth is rapidly cooling, the terrestrial disturbances are lessening, storms are more regular, order is taking place of chaos. This we will designate as the Huronian in North America, and the Cambrian in Europe. Lagoons, lakes, rivers and ponds are frequent. The earth is no longer rent with gigantic volcanoes and terrific earthquakes. In the waters swim annelids, or worms, and the beautiful trilobite crawls over the mud of lagoons around lake Huron. The trilobites feed upon worms, and if we could see them closely, it would be noticed that their eyes are novel in construction, like unto no other animal. The eye is raised above the body in the form of a frustrum of a cone, open upon the side nearest to the same condition of the other eye. This cone is composed of facets the same as that of the common house-fly (which has about 4,000 facets or eyes.) This fact teaches us that the phenomena of light and vision are the same now as they will be when man appears, also that our Silurian waters are sufficiently clear to transmit light. As companions to the lobster-like trilobite with its three lobes, we notice mollusks or shell fish and the industrious coral insect, fabricating its chain coral which will not be found in any period except the Silurian now forming. The one inch trilobite of the upper Cambrian has now attained a length of twenty inches; four hundred species flourish in our Silurian waters. In the upper Silurian we see a companion for the trilobite. It is darting hither and yon; it glistens in the sun-light; it is the first fish; we will call it *placoid*, from its irregular plates with spines, a low order of animal with a fierce nature. The earth is now cool upon its surface. As fish cannot live in hot water the earth's surface must have become measurably cool at this time. The climate is milder, storms are periodical, the flowing waters are muddy, the winds are blowing sand and pulverized rock in all directions. Mollusks, or clams, snails and cuttle-fish, trilobites and fishes, are dying; their bodies are thrown upon the shore, and in a dessicated state are blown to mix with the sand and pulverized rock, thus laying the foundation for soil for producing vegetation; even now we can notice seaweeds, and on the shore where the mud is the richest are the first land plants. These plants will indicate hereafter a new formation called the old red sandstone. We cannot see many aquatic animals near the shores, owing to the red oxide of iron in the water, that gives color to the old red sandstone, which, like all other rocks, except granitic and volcanic, is formed by sediments precipitated from the water. The luxuriant vegetation, just commencing, shows a great amount of carbonic-acid gas in the atmosphere. The flora is now increasing; it is spreading over all dry land; the waters are wearing away the rock to make new formations; snails and clams are making the deposits rich with fauna; and the octopus, or cuttle-fish, is searching for prey. Step by step the earth is being prepared for higher forms of life.

We can see through open clouds the formation of the Devonian period; and, as the earth rolls so as to show the American continent, we will see terrestrial plants, the first step towards terrestrial life. Snails, trilobites and clams are continuing to flourish, and by living and dying, assist to make new strata that are rich in fauna. Although this is the age of fishes, land plants are numerous, ferns, *Lycopodia*, or ground pines, four or five feet high, jointed rushes, Calamites, or tree rushes, twenty to eighty feet in height, and many flowering plants; all producing a flora of one hundred and eighteen species. We also see the first American fish, called the Ganoid, from being covered with bony plates, sometimes entirely encased. The character of these indicates a struggle for existence in the seas, while on land everything is comparatively peaceful.

Where land, water, rocks, seaweed and a few trees were to be seen, we now notice that a luxuriant vegetation is springing up. Vast tropical forests appear, not only at the equator but far north. Most of the whole dry surface is covered with ferns, bushy shrubs, tall coniferous trees as well as those bearing nuts. As carbonic acid gas is to the plant what oxygen is to the animal, we know that the atmosphere around the earth is surcharged with carbonic acid gas. The vegetation flourishes and takes from the atmosphere what would prevent animals from living. This is another step towards preparing the earth for the highest type of life, another product from the nebulous matter. We are now witnessing the formation of coal measures, or the carboniferous period.

Immense rhizodonts, or crocodiles, make their appearance for the first time; they feed upon fish and crustacea. The American nautilus is crawling laboriously, spiders, scorpions and land snails are creeping about, and the crab wades around, and over, beds of clams. While the struggle for existence is just commencing, let us notice the formation of coal. There we see luxuriant vegetation, yonder an impenetrable forest, consisting of *stimaria* pithy without branches, reed-like plants; *lycopods*, or fern-like mosses; *araucarites*, or pines, fifty feet high; in fact we can count five hundred species of plants which produce an arborescent vegetation like unto which we shall never see again. Dense clouds obscure our vision, and while they are clearing up let us indulge in speculation as to the manner of coal formation, which may be in one of three ways: (1) Upheaval by internal disturbances, throwing down the flora, which is covered with sediment and earth, and carbonized by time. (2) In the forests are large bodies of water. Upon these inland seas twigs, leaves, and decomposed trees fall and undergo disintegration, thereby producing an oleaginous substance. Under intense sun-rays this substance loses its volatile matter, leaving a thick, dark, gummy mass; additions are made to it, until it sinks to the bottom, carrying with it perfect wood, leaves and ferns. The whole is covered with sediment which in time becomes a layer of rock. This process is continued until the coal seams are completed. (3) The vegetation grows upon clay. Roots permeate the clay, mingling with shells and marine remains, and this compost is gradually submerged until the foliage is under the water, and from the want of proper nourishment dies. Another layer of clay is formed over the sunken vegetation, upon which grows a new foliage for another coal seam, and so on until the 2,000 feet, or more, of the coal measures are completed. As the cloud passes from between us and the earth, and the atmosphere clears a little, it seems as if the last mode of coal formation is the right one, yet we cannot be positive. We have seen enough to show that vast forests cover the earth—that is the northern part of it—the southern is still under water.

As all mists and clouds pass away, we know we are still viewing the coal measures, the beginning of the paradise of the palæontologists, the elysian fields of the evolutionists. With a piercing eye we can see the first reptiles; the fishes which we have seen so long still flourish, but the trilobites have disappeared. The lagoons and small lakes containing them we have seen filled up, burying their bodies, which the geologist's hammer, ages hence, will unearth to the delight of the fossil hunter. The placoid fish has left its spines, cranial bones and plates in mud, secure for study millions of years from now. The cuttle-fish, clams and snails still add interest to the carboniferous waters. The arborescent vegetation has absorbed the superfluous carbonic acid gas, leaving nitrogen and oxygin for terrestrial respiration. Land is rising and waters subsiding. Limestone, shale, clay, sandstones and slates have been formed by deposits from water; these by grinding and erosion have again become sediment, which being mixed with dead mollusks, trilobites, fishes and vegetable matter, compose a soil capable of producing food for a higher order of life. Ere long the bird-songs will welcome, with music and brilliant plumage, the mammals, and a new era of the earth's existence.

A dense cloud passes between the earth and our position upon the moon, and so ends the palæozoic, or primary stage of the earth. Intervening clouds have caused us to miss many an interesting stage of growth; yet we have certainly learned some things by studying the earth's growth from infancy, with its swaddling clothes of nebulous matter, to its second period of existence.

LIFE IN DEATH.

[From Knowledge.]

No one can have read extensively in any species of literature without coming across passages or occurrences which must, at first sight, at least, appear to him to be incredible, if not absolutely impossible. Nor is this experience peculiar to works of fiction, in which it would, of course, be more excusable than elsewhere; it obtains also in the graver productions of the literary pen, and exaggeration, instead of diminution is the characteristic of the genus *irritabile vatum* everywhere. Passing by, therefore, as being in a measure privileged, the "words that breathe, and the thoughts that burn" of the poet, we will descend into the lower plain of the historian, and endeavor to show that, so far as certain *escaper* or occurrences narrated by the latter are concerned, "truth is sometimes stranger than fiction."

Without stopping to discuss the differences that are produced in wounds inflicted by modern weapons and those that are due to the appliances used in former times, we may glance at the constitutional capacities for endurance, etc., that peculiarities of soil, climate and food impress upon certain races, and so avoid technicalities of all kinds. It is well known that man in the savage or semi-civilized condition has those organs of sight, hearing, touch and the like, with which he has to contend for his support with the beasts that perish, more highly or sensitively developed than his brother of the city or the plains; and as an illustration of this, we may point to the fact, noticed in all the papers, that the Maories who lately visited this country always saw land before any of their fellow passengers. The savage man, *pur sang*, can sustain with impunity an amount of exposure and suffering that would certainly prove fatal to his more civilized brother, and the insensibility with which the American Indians, for instance, endure initiatory and other tribal tortures is simply astounding. A similar measure of imperturbable indifference to pain, and even death, has been noticed in Oriental countries, and all our doctors in India testify to the rapidity and sang-froid with which their patients in that country bear and recover from the effects of grave surgical operations, and other like injuries. But this phase of the question is generally acknowledged; so that we need not dwell further upon it here, and one has only to examine the calf muscles of the *danseuse* or horse jockey, or the biceps of the blacksmith, to find that some of their muscles, as well, perhaps, as of their faculties, are developed at the expense of others.

That doughty deeds of personal daring and adventure were thought more of in the past than they are at present, may be at once admitted, and those hand-to-hand encounters we hear so much of in the pages of Gibbon and other writers are now rarely witnessed. Krupp guns and Martini-Henry rifles have so entirely revolutionized the art of war as to throw mere physical strength into the back ground, and place men, in the aggregate, on a level. Moreover, the atmosphere of the East has never been favourable to the enunciation of truth for the truth's sake, and it was the interest as well as the desire of the crusading writers to exaggerate the performances of their leaders and masters.

Nor need we go back to the crusades for examples in point. They are to be found much nearer home, and deeds are ascribed, by serious writers, to some of our heroes in the East which would do no discredit to the prowess of a Cœur-de-Lion or even a Saladin. Thus, describing some of the hand-to-hand encounters that took place at Meeanee, Sir Charles Napier is represented by his brother as saying ("The conquest of Scinde," Part II., p. 320) that "Fitzgerald's sword on its descent went shear through shield and turban and skull, down to the teeth," and Captain Creichton is said to have assured Swift (Works, Nimmo's Ed., p. 531) that "Fowler (a covenanter) aimed a blow at me, but I warded it off, and with a back stroke cut the upper part of his skull clean off from the nose upward." Dean Millman caps this narrative with an account he gives of the strength and skill of one Ali, who, it appears ("The History of the Jews," Vol. II., p. 96), "Clove the skull of Marhab, the great champion of the Jews (of Khaibor), through his buckler, two turbans, and a diamond which he wore in his helmet, till the sword stuck between his jaws," and whether the weapons used on these occasions were of Damascus or Toledo manufacture, we are unable to say. All we know is, that no such results follow from sabre blows or cuts in these, our degenerate days.

So keen is the instinct of self preservation, or the love of revenge, that men—aye, and women too—have been known to achieve results under their influence which they would scarcely think of at any other time, or under any other impulse; and it is well-known that the excitement of battle and the hope of conquest have often enabled a handful of men to hold their own against overwhelming odds, and induced individuals amongst them to undertake enterprises that would in any other situation appear impossible. It is doubtless, to these feelings that we owe some of the displays noted within; and the greater strength and ferocity of mountaineers is universally acknowledged. The two following stories will enforce and illustrate these points:—

Describing an encounter that took place in the reign of Robert III., between a body of Highlanders and a party of Lowlanders, Mr. Tytler says ("The History of Scotland," Vol. I., pp. 93-4), that "Lindsay had pinned one of these mountaineers, a brawny and powerful man, to the earth; but although mortally wounded, and in the agonies of death, he writhed himself up by main strength, and with the weapon in his body, struck Lindsay a desperate blow with his sword, which cut him through the stirrup and steel-boot into the bone, after which his assailant instantly sunk down and expired." And General Napier mentions a very similar struggle between a soldier of the 22d Regiment and a Belooche swordsman. His account of it runs as follows (*ut supra*, Part I., p. 317): "A soldier, bounding forward, drove his bayonet into the breast of a Belooch. Instead of falling, however, the rugged warrior cast away his shield, and seizing the musket with his left hand, writhed his body forward on the bayonet, until he could avenge himself with one sweep of his sword." He adds that "a Belooch requires no second stroke," and that "both fell dead together." Very tragic, no doubt, but—farther deponent saith not.

We may quote the following from Scott, without in any way vouching for its probability in connection with this kind of mountain warfare, and leave the narrative to speak for itself. Describing the fierce and fatal struggle that took place in 1652 between Evan Cameron, of Lochiel, and an English officer of great strength, Sir Walter says ("Tales of a Grandfather," 1872, pp. 501-2) that "he (Lochiel) had a personal rencontre strongly characteristic of the ferocity of the times." Being singled out by the officer referred to, and as they were separated from the general strife, they fought in single combat for some time. Lochiel was dexterous enough to disarm the Englishman; but his gigantic adversary suddenly closed on him, and in the struggle both fell to the ground, the officer uppermost. He was in the act of grasping at his sword * * * * and was naturrally extending his neck * * * * when the highland chief, making a desperate effort, grasped his enemy by the collar, and snatching with his teeth at the bare and outstretched throat, he seized it as a wild cat might have done, and kept his hold so fast as to tear out the wind-pipe. The officer died in this singular manner. Lochiel was so far from disowning or being ashamed of this mode of defence that he was afterwards heard to say "it was the sweetest morsel he ever tasted."

Let us now turn to another phase of the question, and see how far that deviates from credibility, or accords with the experience of our common life. Dwelling, apparently with much complacency, on what he called the *Horendus Maximini interritus—alias* the painful death of the tyrant Maximinus—Lactantius says (*De Mortibus Persecutorum*):—"*Deinde post multus gravesque cruciatus, cum caput suum parietibus infligeret, exilierunt oculi ejus de caveis;*" and it is worth while asking whether anyone, sane or otherwise, can *per se* "dash out his own brains," or cause his own eyes to start or jump out of their sockets. Grave writers and "able editors," as Carlyle would call them, say the thing is possible, and we occasionally read of such performances in connection with police-cells, lunatic asylums, and the like. Thus the reverend author of a little book called "A Popular History of the Insurrection of 1798," after mentioning the dreadful sufferings that were endured by those who were subjected to the horrors of half hanging and the pitch cap in that year, says (p. 72,) that the victims of these pleasantries "dashed their brains out, in the madness of intolerable pain, against some neighboring wall, and thus put an end at once to their life and misery;" and the following occurs in Mr. O'Hagan's translation of the song of Rowland:"—

> He (R) saw the Saracen seize his sword,
> His eyes he ope'd and he spoke one word—
> * * * * * * * * * *
> On the golden crest he smote him full,
> Shattering steel and bone and skull;
> FORTH FROM HIS HEAD HIS EYES HE BEAT,
> And cast him lifeless before his feet.

where we may safely leave him for the present.

If now, making every allowance for the poetic license assumed above, as well as for the juxtaposition of bone and skull, as if they were not here as elsewhere identical, we come to the beating out of the eyes and the dashing out of the brains, and ask ourselves if such things ever can or ever do happen, our answer will be that they probably never do. And yet stranger occurrences than even these have been gravely recorded by eminent historians. As an instance in point, we will quote the following from Milman. Mentioning the hard usage according to which the Syndic of the Jews was obliged to salute the mayor of Toulouse about the year 980, he says (*ut supra*, vol. ii., p.

146) that: "A stern, iron-handed magistrate struck the poor Syndic with such force as to scatter the brains of the unfortunate unbeliever" —and the hand that achieved this feat must, indeed, have been made of iron or other equally potent material; for unless this wretched Syndic was suffering from that very rare condition called *Mollities Ossium*, or that our magistrate had the strength of a Hercules, it is hard to conceive how such a result could follow from such a cause. And yet there is no affectation of poetic license or unreality here—the possibility of the thing is taken for granted, and there is no qualification such as even a query or note of admiration could supply. All we need, therefore, say in this connection here, is that where grave and learned writers like Milman put forward such statements without question, we ought not to be surprised when we find Scott and other romancists of his class investing their heroes with such attributes as are clearly beyond the reach of ordinary mortals.

It is, we believe, generally admitted that negroes have sometimes succeeded in committing suicide by swallowing their tongues; in other words, by doubling them back, and then drawing them into their throat, so as to stop the access of air to the lungs; and excision of the tongue is now a recognized surgical operation. But this operation to be successful or effective must be performed by a skilled surgeon or a trained executioner, and persons desirous of shuffling off the mortal coil never dream of trying to do so through the medium of this organ.

We have it, however, on the authority of Major Macpherson ("Memorials of Service in India," p. 67) that, "a Khond, captured by our troops in Baramootah, immediately tore out his tongue by the roots and died," probably of the hemorrhage which such attempt would necessarily entail. But it does not seem possible for anyone to tear out his own tongue with his own unaided hands, and in proof of this we have only to ask our readers to try and seize that somewhat slippery muscle themselves. If they will try they will probably find that they cannot introduce the hand into the mouth without producing sensations that would prove fatal to such an attempt; and, even supposing they had so far succeeded, how are they to drag—for that's the assumption—this very elastic piece of mechanism from its strong and deep-rooted attachments? The thing seems to be impossible, and we need not fear that our allusion to it will induce any future *felo-de-se* to prefer it to the easier and speedier alternatives of a jump over London bridge or a resort to the ever ready razor.

But we must hurry on to a close, and with this view restrict ourselves to one or more illustrative extracts of the character here contemplated. Describing the decisive battle that took place between the forces of Mahommed Shah Adily and those of the famous Akbur, Major Briggs says (Rise of the Mohammedan Power in India), that the former's commander-in-chief, one Hemoo, was pierced in the eye with an arrow, which penetrated the brain; "he sunk into his howda from extreme agony; and the greater part of his troops fearing that his wound was mortal, left him. Raising himself again, Hemoo drew the arrow from his head, and with it the eye from its socket, which he wrapt up in his handkerchief. He continued to fight with unabated vigor until he contrived, with the few men who remained faithful to him, to force his way through the enemy's line." That a brave man should continue to fight for dear life after he had lost an eye, in battle or otherwise, is no very uncommon or extraordinary thing; but that he should do so under the circumstances here disclosed is certainly unusual, and if such wounds as are casually inflicted in this region by the poke of an umbrella handle or the thrust of a walking-stick prove, as we believe they always do, fatal, we may well doubt the practicability of the feat narrated above.

A writer in the "Philosophical Transactions," (A New Abridgment, Vol. IV., pp. 106-7) gives such an account of the effects of a cancer on the brain of a certain person as, if verifiable, would go far to show that Shakespeare's belief, "the man is dead when the brains are out," admits of some qualification. This account may, for brevity's sake, be summarized as follows:—A certain man "had a cancer which spread itself, in spite of the endeavours of the most eminent surgeons of the day, over all the cheek, into his mouth, and across the upper part of his nose, where it perforated the bone and ate away all the flesh round his eye, so that he could take out the latter with his own hands," and we suppose, though this is not actually said, put it into his pocket. It finally exposed the dura mater, and with it the brain itself to view, several portions of which came away. "And what was most extraordinary was that he perfectly retained his senses, and rose every day to dress the ulcer himself till a considerable quantity of the brain had come away." When he died, four days after taking to his bed for the last time, "his brain *was totally consumed*, and nothing remained in the cranium but a small quantity of black putrid matter," and we are gravely asked by this philosophical writer to believe this.

Were we to do so, we would be simply flying in the teeth of all experience, and reducing the researches and observations of our best scientists to a level with the wild exaggerations of Mr. Holloway or St. John Long. This we decline to do, and if a man may go about his ordinary business without any brains, there is no good reason why he may not do the same without his head, or why, in a word, the miracle of St. Denis may not be reproduced, *puris in naturalibus*, any day, at the Egyptian Hall or elsewhere, in our very midst.

A CHINESE COLUMBUS.*

In the year 499 of our era there appeared at the city of King-Cheu a Buddhist bonze, or priest, who told some very wonderful tales about his wanderings,—so wonderful, indeed, that the Bureaucracy of the day wrote down the most credible of them in the annals of the empire. Of course we are all thoroughly conversant with the history of Chinese political affairs, and do not need to be reminded that at this momentous epoch Tonghoenheu, the celestial Cæsar of the day, was besieged in his palace at the above named city by his no less celestial brother; that this brother, being the stronger, was declared "Protector of the Empire," and resided at King-Cheu where he soon after deposed the sluggard, Tonghoenheu, and ascended the throne in his stead. But rebellion breeds rebellion, and the last monarch of the Tsi dynasty soon had to succumb to the superior prowess of Liang Wu-ti who mounted the throne as founder of the Liang dynasty.

Now the monarchs of the Tsi dynasty were very good sort of people in their way, but they had not been sagacious, or pious, enough to embrace the Buddhist religion. On the contrary, Wu-ti, like his western prototype, Constantine, saw "which way the cat was going to jump" and entered with ardor the "way" of Sakyi-Muni and became the patron of Buddhism. So that while Hwui-Shan, the bonze before mentioned, arrived at King-Cheu in 499, A. D., the unsettled condition of affairs and the natural incredulity of a gentile court prevented him from telling his story to sympathetic and attending ears till 502, when Wu-ti became emperor. Doubtless he was kept dancing about from camp to court, cooling his heels in ante-chambers, much after the fashion practiced on Columbus a thousand years later, in the interval between his appearance and his recognition by the new monarch. Shortly after the accession of Wu-ti, however, it is related in the memoirs, Liang-sse-kong-ki, that an envoy from the Kingdom of Fu-sang presented himself and offered divers productions of his country. The Emperor was at once interested and ordered his minister, the Lord Yu-kie, to interrogate the embassador about his country as was the custom. It is stated in these memoirs that the envoy wept (why this pathos was manifested is not plain) and responded with "respectful ardor;" but nothing is here told of his answers or his presents to Wu-ti, (except that he displayed 300 pounds of "silk" made from the Fu-sang tree) though it is said that the Lord Yu-kie in after years, won a great reputation as a story-teller by rehearsing, with comments and adornments, the Fu-sang envoy's narratives. Neither is there anything here said which connects our friend, Hwui-Shan, with this embassy, except in the circumstantial way described. At any rate, the probabilities of the bonze and the envoy being identical are quite as well founded as most historical speculations. Especially does this appear true when we find in another Chinese book a statement that "the officials of the Tsi dynasty make no mention of him (Hwui Shan) and it is the books of the Liang dynasty which contain the account of Hwui-Shan regarding "Fu-sang."

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*An Inglorious Columbus; or, Evidence that Hwui Shan and a party of Buddhist Monks from Afghanistan Discovered America in the Fifth Century, A. D. By Edward P. Vining. New York: D. Appleton and Company, 1885.

Now for the story that Hwui-Shan, or the envoy, told.

Li-yan-cheu. an author who lived about the commencement of the seventh century, in the Nanszu, a book of annals, relates the arrival of the bonze, Hwui-Shan, as stated, and his story is given,—perhaps in the very words with which Yu-kie transcribed it. The historian, Ma Twan-lin, a contemporary of Marco Polo, copied this relation into his famous work, the "Antiquarian Researches;" and it was also copied into the great Encyclopedia known as Wen-hien-tong-kao. Li-yan-cheu adds to the statements in Hwui-Shan's narrative that Fu-sang was unknown to the Chinese, prior to the year 458, A. D. This is the narrative (I use Mr. Vining's translation as being, perhaps, as authentic as any other) in full, as given by Ma Twan-lin:

"FU-SANG."

"In the first year of the reign of the Tsi dynasty, known by the designation of Yung-Yuen, or "Everlasting Foundation," (*i. e.* in the year 499, A. D.,) a shaman, or Buddhist priest, named Hwui-Shan, came to King-Cheu from that country, and narrated the following account regarding the country of Fu-sang, (or Fu-sang kwoh.")

" 'Fu-sang is situated twice ten-thousand *li* (Chinese miles), or more, to the east of the great Han country. That land is also situated at the east of the Middle Kingdom, (China). That region has many Fu-sang trees, and it is from these trees that the country derives its name. The leaves of the Fu-sang resemble—[1] and the first sprouts are like those of the bamboo. The people of the country eat them and the (or a) fruit, which is like a pear (in form,) but of a reddish color. [2] They spin thread from its bark from which they make cloth, of which they make clothing. They also manufacture a finer fabric from it.[3] In constructing houses they use planks, such as are generally used in building adobe walls.[4] They have no citadels or walled cities.[5] They have literary characters and make paper from the bark of the Fu-sang. They have no military weapons or armour, and they do not wage war in that kingdom.[6]

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[1] De Guignes: "Those of the tree which the Chinese call tong;' Klaproth: 'those of the Toung (Bignonia Tomentosa;') Neumann: 'the Dryandra Cordifolio;' de Rosny (the Japanese account:) 'the To tree;' Julien: 'the Thong tree (Paullownia Imperialis;') d'Hervey: 'the Tong tree' (according to Leland, the Dryandra Cordata, or Elæococca Verucosa;) Williams: 'the Tung tree.'

[2] All the translators state that the first sprouts are eaten; but our author is the only one of them who states that the fruit is also eaten; the others merely describe it.

[3] The Japanese account doesn't mention the finer fabric.

[4] DeGuignes says the boards are made from the Fu-sang tree, and states that these "are employed in the construction of their houses;" Klaproth says nothing about their use in "building adobe walls;" Neumann: "Their houses are made of wooden beams;" Julien: they "construct houses of planks," etc.

According to their rules (of government, or of religion) they have a southern and a northern place of confinement. An offender who has transgressed but slightly, enters the southern place of confinement; but if he has sinned heavily, he enters the northern place of confinement. If there is pardon for him he is sent away to (or, possibly, from) the southern place of confinement, but if he cannot be pardoned, then he is sent away to the northern one.[7] The men and women dwelling in the northern place of confinement, when they mate (or have mated) and bear (or have borne) children; the boys are made slaves at the age of eight years, and the girls at the age of nine years. The criminal, (or the criminal's body) is not allowed to go out up to (or at) the time of his death.[8] When a nobleman has committed a crime the people of the country hold a great assemblage and sit in judgment on the culprit in an excavated tumulus. They feast and drink before him, and bid him farewell when parting from him, as if taking leave of a dying man. Then they surround him with ashes there.[9] For a single crime (or a crime of the first magnitude,) only one person (the culprit) was hidden (or sent) away. For two crimes (or a crime of the second magnitude,) the children and grandchildren were included in the punishment. For three crimes (or a crime of the third magnitude,) seven generations were included in the punishment.[10]

The title of the King of the country is *Yih-kee* "the chief of the multitudes." The noblemen of the first *Tuilu*; those of the second rank *Little Tuilu*; and those of the third rank *Natosha*. The king of the country, when he walks abroad, is preceeded and followed with drums and horns. The color of his garments is changed according to the mutations of the years. The first and second years, (of a ten year cycle) they are blue (or green), the third and fourth years, they are red; the fifth and sixth years, yellow; the seventh and eighth years, white; the ninth and tenth years, black.[11] They have cattle horns, of which the long ones are used to contain (some of their) possessions, the best of them reaching (a capacity of) twice ten times as much as the capacity of a common horn.[12] They have horse-carts, cattle-carts and deer-carts. The people of the country raise deer as cattle are raised in the Middle Kingdom (China). From milk they make Koumiss.[13] They have red pears kept unspoiled throughout the year and they also have tomatoes.[14] The ground is destitute of iron, but they have copper. Gold and silver are not valued. In their markets there are no taxes or fixed prices.[15] When they marry it is the custom of the son-in-law to go and erect a house (or cabin) outside of the door of the dwelling of the young woman (whom he desires to marry). Morning and evening he sprinkles and sweeps (the ground) for a year, and if the young woman is not pleased with him, she then sends him away; but if they are mutually pleased, then the marriage is completed, the marriage ceremonies being for the most part, like those of the Middle Kingdom (China). For a father, mother, wife or son,[16] they mourn for seven days without eating. For a grand-father or grand-mother they mourn for five days without eating; for an elder brother, younger brother, or father's younger brother, or for the corresponding female relatives, or for an elder sister or younger sister, three days without eating.[17] They set up an image of the spirit (of the deceased person) and reverence it, and offer libations to it morning and evening. In their mourning usages they do not wear mourning garments, or mourning badges. A king who inherits the throne does not occupy himself with the affairs of the government for the first three years after his accession. Formerly they were ignorant and knew nothing about the Buddhist religion; but during the the reign of the Sung dynasty, in the second year of the period called Ta-ming (or Great Brightness, i. e., in the year 458, A. D.), from the country of Ki-pin (i. e., Cophene, now Cabul), formerly, five men who were pi-k'iu (i. e., bhikshus, mendicant Buddhist monks) went by a voyage to that country, and made Buddha's rules and his religious books and images known among them, taught the command to forsake the family (for the purpose of entering a monastery), and finally reformed the rudeness of its customs."

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[5] Klaproth says "there are no cities or walled habitations;" the Japanese account is similar; Williams: "there are no walled cities with gates."

[6] De Guignes: "they love peace;" Klaproth: "have no weapons, or armies;" Neumann: "have no weapons;" de Rosny (Japanese account:) "have no offensive weapons or defensive armour;" Julien: "have neither armies or lances;" d'Hervey: "have no soldiers;" Williams: "no mailed soldiers." All but de Guignes agree that the text says they do not wage war; he omits any reference to this fact.

[7] De Guignes: "the most guilty are placed in the northern prison, and are afterwards transferred into that of the South, if they obtain their pardon; otherwise they are condemned to remain all their lives in the first." D'Hervey says, "they never can be released" from the northern prison, and Williams: "Criminals, when pardoned are let out of the southern prison; but those in the northern prison are not pardoned."

[8] Neither de Guignes, Neumann, or d'Hervey make this statement.

[9] Neumann says, "they bestrew him with ashes;" and de Guignes, "those who have merited death are buried alive in ashes."

[10] De Guignes, speaking of the criminals "burried alive in ashes," says "their posterity is punished according to the magnitude of the crime;" Klaproth: "For an offense of little gravity the criminal alone is punished, but for a great crime the culprit, his sons and grand-sons, are punished; finally, for the greatest offenses, his descendants to the seventh generation are included in the punishment;" Neumann, instead of grading the crimes, grades the criminals, that is the punishment is graded as above, according as the culprit is of "low rank," "high rank" or "highest rank;" Julien states that these punishments are inflicted according as one, two or three crimes were committed; d'Hervey and Williams grade the magnitude of the crime.

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[11] De Guignes, "he changes the color of his garments every year."

[12] De Guigues: "The cattle of the country bear a considerable weight upon their horns," Klaproth: "The cattle have long horns, upon which burdens are loaded, which weigh as much sometimes as twenty ho, (of 120 Chinese pounds);" Neumann; "the oxen have such large horns, that they contain as much as ten sheep-skins; the people use them to keep all kinds of goods;'" Julien; "they have cattle whose horns are very long, and who bear upon their horns a weight as great as twenty ho;" d'Hervey; "Ox horns are found in Fusang, so large that their capacity is sometimes as great as two hundred bushels. They are used to contain all sorts of things;" Williams: "There are oxen with long horns, so long that they will hold things—the biggest as much as five pecks."

[13] De Guignes, Klaproth, Neumann, de Rosny, d'Hervey and Williams, state that the milk is obtained from female deer. None of them call the product Koumiss; some calling it "cream" others "butter," others "cheese," and d'Hervey simply says the milk "makes part of their food."

[14] De Guignes says, instead of "tomatoes," "iris and peaches;" Klaproth, 'many vines;' Neumann, "apples and reeds, mats being made from the last;" Julien and d'Hervey, "many grapes;" Williams, "water-rushes and peaches."

[15] Neumann says that gold and silver "do not serve as the medium of exchange in the markets."

[16] The others have "parents" except de Guignes.

[17] The others do not say about relative ages except Neumann who says "younger brother or sister," and d'Hervey who says, "without distinction between the elder and younger."

The first question that arises upon reading the above narration is where was Fusang? And it is this question that Mr. Edward P. Vining essays to answer in his book "An Inglorious Columbus." He is of opinion that Fusang was Mexico, and we will now examine his arguments.

It must be premised, however, that this question has been the subject of much controversy. Originally started by de Guignes in 1761, it has received attention pro and con from Klaproth, de Paravey, Neumann, Perez, d'Eichthal, Saint Martin, Adam, Leland, Williams, Bancroft and others, and has alternately been patronized and discountenanced by savants. Those who have advocated an American *locus in quo* for Fusang have differed very widely as to the exact position it should occupy on the map. De Guignes thought it some point on the north-west coast of America; de Paravey located it in Oregon, at first, then California; Neumann, d'Eichthal with Leland and our author do not doubt that Mexico or Central America answers the description.

It will be noted that Fusang is situated, according to the account of Hwui Shan, twenty thousand *li* to the east of the great Han Country, and that it is also to the east of China. This raises two questions: (1) where was the Great Han Country, and (2) what was the length of the *li* in the fifth and sixth centuries? Of course there have been a variety of opinions as to the location of Tahan, or the Country of Great Han. De Guignes thought he had found it in Alaska by tracing an itinerary of a land route to that country, mentioned in the Chinese books, and making it end in Kamtchatka. Recent authorities have discovered, however, that there were two countries known as Tahan—Tahan of the North, situated in Siberia so far north that the day only sufficed in length "to roast a breast of mutton," and Tahan of the East, which could only be found by coasting northward along the seaboard of China to a point seven thousand *li* to the northeast of Japan, known as the "Land of Marked Bodies," and from thence sailing five thousand *li*, or more, to the east. It will be observed from this that Fusang was situated at a distance of 33,000 *li* from Japan. According to de Rosny's correction of Ma Twa-lin (who gave the distance as 12,000 *li*) the distance from Lolang, or Laifang, to Japar was one thousand *li*, making the route from China to Fusang 34,000 *li* in length. Now what was the value of the *li* at that time?

While it is true that the distance on Chinese roads as given by ancient books ought to furnish some help there is really little profit to be derived from them. The *li* of China and Corea differs very widely, and yet there is every reason to believe that distances were frequently given without regard to this difference. Corea was situated on the direct route to Japan, and it is quite probable that information obtained from the Coreans, respecting distances, was carried back to China by navagitors and helped to confuse the subject. Yet there is, after all, a very general consensus of authority that the ancient Chinese *li* was about one-third of an English statute mile—about 1,700 feet. Using this as the basis of calculation, it will be found that Fu-sang could be reached from China by a voyage 11,000 miles. The general direction of this voyage being to the east, where would the navigator reach his journey's end? By glancing at a globe it will be seen that a ship sailing north-eastwardly from the southern coast of Japan, would reach at a distance of about 5,000 *li*, or 1,300 miles the eastern shore of Kamtchatka, or the Aleutian Island; from thence sailing east 7,000 *li*, or 2,300 miles it would arrive at the country of Tahan, or the main island of Alaska; from thence sailing in an easterly direction a voyage of 20,000 *li*, or 6,600 miles, carries it to the shores of southern Mexico—a country lying eastward of Tahan and China alike. This is, briefly, the position of Mr. Vining, and having thus arrived at Fusang let us see whether we find there the products, the customs, the laws and policy described by Hwui-Shan, and, above all, whether the religion of Buddha can be traced in the ceremonials and tenets of native cults.

First, then, as to the products. The most remarkable of these, the one from which the country took its name, was the Fu-sang tree. The leaves of this tree were said to resemble the Tung tree; but no two translators agree as to the tree thus designated by this name, and thus we get no aid in identifying it from this statement. But it was also asserted that the young plant resembled bamboo-shoots, and were edible; that its fruit was pear shaped and reddish in colour and from its bark threads were spun and woven into cloth, both coarse and fine; and that paper was manufactured from it. Is there any plant in Mexico that answers in any measure this description? If such a plant exists it would have attracted the attention of the Spanish conquerors and been classed among the most valuable products of the land. Most of us have seen the century-plant and are acquainted with its marvelous properties and uses. In Mexico it is called the Maguey, but its botanical name is *Agave Americana*; and it has been suggested that this was the plant Hwui-Shan attempted to describe. The objection that it is not a tree is untenable for the reason that the Chinese place many plants in the list of trees which are only shrubs, and even early authors like Acosta and Gage, struck by its lofty flowering-stalk, follow Hwui-Shan's example and call the Maguey a "tree." As to its uses Acosta states: "The Maguey is the tree of marvels, to which the Indians are accustomed to ascribe miracles, inasmuch as it gives them water, wine, oil, vinegar, honey, syrup, thread and a thousand other things. It is a tree which the Indians of New Spain esteem very highly." Clavigero, speaking of the *Agaves* to be found in Mexico, says: "Some species furnish protecting enclosures, and afford impassable hedges to other objects of cultivation. From the juice of others are extracted honey, sugar, vinegar, pulque, and ardent spirits. From the trunk and thickest part of the leaves, roasted in the earth, an agreeable food is obtained. The flowering-stalks serve as beams, and the leaves as roofs for houses. The thorns answer for lancets, awls, needles, arrow-heads, and other cutting and penetrating instruments. But the fibrous substance of the leaves is the most important gift of the agaves of Mexico. According to the species, the fiber varies in quality from the coarsest hemp to the finest flax, and may be employed as a superior substitute for both. From it the ancient Mexicans fabricated their thread and cordage; mats and bagging; shoes and clothing; webs equivalent to cambric and canvas; the hammocks in which they were born and in which they reposed and died, and the paper on which they printed their histories, and with which they adored and adorned their Gods. * * * It is not, therefore, surprising that the ancient Mexicans used some part, or preparation, of these plants in their civil, military and religious ceremonies, and at marriages and at deaths; nor that they perpetuated an allusion to their properties in the name of their capital.

It is objected, however, that it is the bark, and not the leaves, of the Fu-sang tree that furnished the fiber for textile use and that it bore a reddish pear. But the Abbe Brasseur de Bourbourg made the same mistake as Hwui-Shan (unless Yu-Kie was the real culprit) in this particular, though he was well acquainted with Mexico and her products, for he says, in one place, that the Cokchiquels made garments from the *bark* of trees and of the Maguey and, in another, that the Mexicans get hemp from the *bark* of the Maguey. As to the pears it may be said that the Chinese are rather "scattering" in terminology, and it would not be a wider applciation of the term *peae* to call the seed-pod of the Agave by that name, than to call the pod of the cotton plant "the Flossy Blossoming Peach." as the Chinese do. The people from Fu-sang also made paper from their tree; so did the Ancient Mexicans from the Agave.

There is then a very remarkable

coincidence in the characteristics of the two plants if they are not the same.

Another production of the Fu-sang country was immense cattle horns—capable of containing, says the account, as much as twenty common horns. At the time Mexico was entered by the Spaniards, it is true, no cattle were to be found there, but it is re[illegible]d in one of the histories of the Spanish conquest that Montezuma showed his conquerors "as a curiosity, cattle horns of enormous dimensions." And Humbolt relates the finding of monstrous cattle horns in ruins in south-western Mexico. It is known that there is a species of sheep in the Rocky Mountains known as "Big-horns," from the remarkable development of their horns. At the time of the conquest these sheep had been exterminated in Mexico, just as the Bison has since been exterminated east of Colorado, and could only be found in much the same range as now. Coronado, in his celebrated raid to the north, saw sheep "as big as a horse with very great horns." He also saw one horn which he exhibited to his army, a fathom and a half in length, and as large at the base as a man's thigh. Surely such animals are worthy of being called cattle, and it is quite likely they were still to be found among the mountains of Anahuac 1,500 years ago.

The various kinds of carts mentioned are not so easily accounted for. Though we cannot be certain that carts were never used by the American aborigines we have no authentic notice of their use. The Indians of the west, and very likely the Aztecs too, used dogs to draw rudely improvised sledges made of lodge-poles, upon which they loaded their effects. And as to the raising of deer, it is a well attested fact that the Aztecs kept preserves and had large herds of deer.

The red pears, if not the same mentioned as the fruit of the Fu-sang, are easily found. Either the prickly pear or the persimmon would answer the description, as both are kept "unspoiled throughout the year." Tomatoes, if that is the true translation, were a favorite vegetable with ancient Mexicans, and we have acquired their liking for it.

As for minerals it is known that the Aztecs did not use iron but used copper instead, that gold and silver were merely used as ornaments by them, and never as a medium of exchange.

In speaking of the various carts in use, the term "horse-cart" is used. Now it was thought to be well settled that the horse was extinct in America when the Spaniards arrived; but of late several investigators have found reason to doubt this. Capt. Berthoud in the Review for November, 1881, gives reasons for thinking that horses existed in South America and were seen at the time of its discovery; and Dudley says that Drake found many wild horses at the northward (on theOregon coast)—at which he wondered, because the Spaniards had never found horses in America. The author of Bryant's History of the United States, commenting on this statement, says: "It is customary to account for the immense herds of American horses on the assumption that the Spaniards introduced them. Drake's visit, however, to Port New Albion was but thirty-eight years after Coronado's visit to Cibola, which as we now know, was at least five hundred miles away. It is difficult to believe that a few stray horses from Coronado's troop, should, in so few years have multiplied into large herds as observed by Drake on the distant sea-board at Oregon."

From these considerations and the well known fact that the fossil horse of America is identical with the wild-horse, it does not seem improbable that the ancient inhabitants of Mexico used horses as draught animals.

[TO BE CONTINUED.]

SOME OF THE WONDERFUL PRODUCTIONS OF THE SEA.*

Among the few sea-flowers that we have already touched upon, none are more important than the "reef-building corals" of the torrid zone, to which we have already alluded. The very gaudiest live among the coral reefs. There these sensitive flowers of the ocean build their submarine palaces, gliding from coral branch to coral branch, and from one lustrous petal to another. It is not to be wondered at that these little creatures, growing like plants, assume all forms of vegetation. Among them we find lichens and mosses, leaves and columns, shrubs and trees. And all these various shapes, in every instance, proceed from a single germ, which grows and buds under a few simple laws of developement. Everywhere, throughout this region, the eye is charmed with the brilliancy of color. Take the yellow lilac fans of the "Gorgona," worked like jewelry in filagree; the elegant "cup" coral with its pure translucent white, tinged with a delicate rose and variegated with the richest chestnut; the rare "tuft" coral, like a massive, thickly-branched tree, with its individual corals set upon one common stem; the "organ pipe," its tubes arranged like the pipes of a church organ, and beautiful in the extreme in its pink and light green, contrasting finely with the structure it so wonderfully raises. These, with hosts of others, shine in the darkness like "fairy stars," and in a very singular way accomplish their gigantic work.

These massive structures are all of great beauty; but *how* are they reared? Let us see. In the hot summer months, millions of jelly-like spawns are thrown off by the parent animal. For awhile they enjoy their freedom and revel in the exercise of their locomotive powers; but soon becoming tired, they settle down upon some firm, stationary body. At once they prepare to take on a different form, becoming star-like in their appearance, with tentacles around the mouth, very much as leaves surround the center of a flower. After awhile each one of these ray-like parts pushes out extensions, which, in their turn, assume the shape of tiny stars, and establish their own existence by exhibiting an independent mouth. These polyps are all soft-bodied organisms, consisting of many varieties and having the organic functions of secreting carbonate of lime, which, with some other ingredients, as silica, and small portions of sand, compose the hard substance we call coral.

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*From Journal of Education.

The body of the polyp consists of a cylindrical skin, with an inside sac, which is the stomach, and is furnished with little thread-like appendages with which it draws in its food, and it is between the outer skin and this sac or stomach that the limestone is secreted which forms the coral substances. It is a very common mistake to suppose that the coral producers are *laborers.* Nature has simply provided that in receiving their food the polyps should select from the ingredients of the sea-water that which is capable of being reduced by simple functional processes into coral, just as a plant selects and secretes from the earth that kind of nourishment which makes stems, leaves, and buds.

And so these beautiful creatures, these living sensitive animals moving at will and clad in the gay forms and bright colorings of a flower, are really the very *flowers* themselves; and what we call coral are not retreats into which the coral coloring comes and goes like a bird building her nest, but part and parcel of the creature itself; just as much so as are bones belonging to the human body, with this difference,—that in the case of the polyp, the stony part (representing the osseous structure of man) is all at the lower portion, while the upper part is soft and flexible, but in a healthy human body they are inseparably combined.

Naturalists have found out of late that the industry of these polyps does not consist in *building,* as hitherto supposed, but in *eating,* bringing about, as a result, a strong, stony structure, which must necessarily be slow in its formation. The denser the deposit the more valuable the coral. No one has seen just how these marvellous dwellings are built. It is a God-given power; and yet, what piles of stone are accumulated by these minute creatures,—as some one has said, "reared for eternity."

There are few natural objects more pleasing than a company of these corallets; for as the polyps rise above their cells and extend their fine, long tentacles,—resembling threads of pure white silk,—waving them to and fro like the radiated petals of a fairy-flower swayed by a gentle zephyr, or like a minute fan slightly concave at the edge, they present an exceedingly elegant appearance, and when quietly at rest they are said to be like "hoar frost on bed of moss."

. But these fairy-like implements with which the coral polyp gathers in its food are not such innocent objects as they appear to the naked eye. If you could see them under a glass you would find on the tentacles a row of slight protuberances, one at the tip longer than the rest. This is the little creature's armory, for concealed within them are lasso-like filaments, called capsule threads, which they can throw out many times the length of the body. With these they capture their prey, paralyzing them by the fluid therein contained.

These are called *cridæ*, or thread capsules, because the small sheaths containing these slender threads are coiled, ready for use, and are darted out so rapidly when any victim comes within reach. The shock, however, is much less severe than that from the anemones, of which we have already spoken. The food of the polyp is always digested before the animal retires within its cell, or *calcle*.

In the Coralidæ the calcareous matter is firm and solid throughout, and all of a color, varying from crimson to rose-red. In the *corallium rubrum*, the red, or precious coral, the outer crust resembles the bark of a tree, and may be readily rolled off in this species. The true coral is the red axis, which it envelops, which is like a six-rayed star. Some shades are immensely valuable. The real *rose-pink* is much sought after, and will bring twenty-five times its own weight in gold, and is always sold by the *ounce* or *pennyweight*. It is found from thirty to a thousand feet below the surface of the sea.

Black coral, *Corallium nigrescens*, is still more scarce.

These massive forms of coral would never reach their vast proportions if it were not for nature's peculiar provisions: Life and death, occurring simultaneously, each aiding in one and the same object. Each mature polyp when fixed in its cell may be considered as resting upon the tomb of its ancestors, and when it dies *its* descendants will repeat the process over its remains, and its own body, within which its share of coral had been secreted, will be the base of a new living descendant. What marvels we find at every step of the way!

The variety of corals are very numerous and all extremely interesting and beautiful, but as this chapter is mainly designed to encourage further investigation, we shall not go on with any lengthened description.

The more we study the mysteries of the ocean the more we shall see that every living being, even to the most minute, is perfect in itself, and that the almost unknown body of the *stone* animal is as fearfully and wonderfully made, as that of man himself; while all, by the astounding wisdom of God, are constituted most favorably for the purposes they are designed to fill in the kingdom of nature, and are working together for

His good who formed them for His own especial service!

"Then study Nature with reverence high,
And she will give the key,
So shalt thou learn to comprehend
The 'Secrets of the Sea.'"

THE FRENCH ACADEMY IN ITS ORIGIN.*

"I undertake, since you request it, to write down what I know of the French academy,—a society about which many people talk, but which few people know as it ought to be known."

These are the words with which Pelisson, the original historian of that famous society, began his narrative. Notwithstanding the charm of his graceful style, the exact additions to the record which were made by the Abbe Olivet, and to the much more recent notes of Livet, to say nothing of Kerviler's readable bibliography, and Arsene Houssaye's witty and satirical criticism, the French academy remains to this day, as it was in 1653, when Pelisson's story was first anonymously published,—"a society about which many people talk, but which few people understand." Now and then some enthusiastic English or American writer proposes an English or an American reproduction, or a critic skilled in the poise of conflicting ideas sets forth the possibilities and the difficulties of organizing such an imperial agency, amid the decentralized institutions of Great Britain and the United States. Mathew Arnold concludes his famous essay on this subject by a sentence in which admiration is tempered with doubt. "An academy," he says, "quite like the French academy,—a sovereign organ of the highest literary opinion, a recognized authority in matters of intellectual tone and taste, we shall hardly have, and perhaps we ought not to wish to have it." We may venture to add, that, if London cannot have its literary court to exercise an acknowledged supremacy within a prescribed domain, New York and Washington must wait awhile before their political or financial power can originate a society which will be potent in the promotion of letters. Nevertheless, the growth of the French academy, and its influence upon the scientific, as well as the literary progress of France, are quite worth studying. It is the parent of the Institute of France, but it is the child of a modest coterie of literary people such as may be found in almost every cultivated town. Its extraordinary growth is due in no small degree to that innate love of symmetrical organization, or of good form, which the French exhibit in many phases of activity. It owes not a little to the power of the monarchy in the days of Louis XIV.

The French academy is always spoken of as founded in 1635, but several years before that date its nucleus was in existence. As early as

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*Science, for August.

1629, a number of bright men in different parts of Paris, suffering from the impediments of a great city, and finding it inconvenient to pay visits without finding their acquaintances at home, determined to have a weekly meeting at a private house. They were men of letters, above the average ability, associated like our literary clubs, by the principle of good-fellow-ship, with the slightest possible regulations, and having at first no higher purpose than familiar and friendly conversation on business, news and literature, the interview ending with a promenade or a collation. If any of the company wrote something on which he wished genuine criticism, here was his opportunity to receive unguarded and honest comments. In later years the members of the academy looked back to this golden age of its infancy, when all that is bright and charming in literary society was enjoyed without noise, parade, or animosity. To avoid the intrusion of unwelcome fame, even the fact that there was such a club was for a long time not mentioned to those who were unconnected with it. But such could not long be hidden beneath a bushel. One by one, outsiders heard of that charming circle which was not engaged in the exchange of compliments and flattery, but which openly and boldly pointed out to the members their literary faults. All this Arcadian chapter is charmingly told by Pelisson, whose narrative we are following as others have so often done before. Boisrobert was then in high favor with Richelieu,—the one to whom the Cardinal's physician referred when he said, "Monseigneur, I can prescribe nothing more for you, but two drachms of Boisrobert after dinner." From this source the great minister of France heard of the brilliant coterie which met at the house of Couvart. The far-sighted sagacity of Richelieu perceived the possibility of giving public authority to these self-contained critics, and through Boisrobert he offered to become the protector of the club, and to give it the authority of *Lettres patentes*. His proposals were gladly accepted as honors from the crown, [*] and after due deliberation and formalities, the charter passed under the royal hand and seal in the month of January, 1635. This document is far more interesting at this late day than most such official papers. It abounds in lofty sentiments admirably expressed. It recognizes the conferences which have been held by the pre-existent assembly; it confirms and defines their purpose to be the promotion of eloquence, that is to say, of skill in the use of language; it bestows upon the infant society the name which has now become historic; it limits the membership to forty persons; and it confers upon the cheif and protector, Cardinal Richelieu, the authorization of officers, statutes and by-laws. Various other names had been proposed,—*l'Academie des beaux esprits*, *l'Academie de l'eloquence*, *l'Academie eminente*,—but finally *Academie francaise* was selected, because it was more modest and more appropriate.

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[*] The writer is here following Pelisson, who wrote at a time when the truth could not be spoken. Guizot says that the proposal was received with consternation, and that scarcely a member of the voluntary society did not testify displeasure. The argument of Chapelain that "they had to do with a man who willed in no half-hearted way whatever he willed, and who was not accustomed to meet resistance or suffer it with impunity," and that "he would consider it an insult to disregard his protection and visit his resentment upon each individual," shows quite explicitly the inducements that led to the acceptance of the proposal.—W. W.

The original statutes define in much detail the sphere of the academy, and its methods of procedure. Its purpose is thus stated in the twenty-fourth article. "The principal function of the academy will be to labor with all possible care and dilligence to give certain rules to our language, and to make it pure, eloquent and capable of treating the arts and the sciences." In subsequent paragraphs, provision is made for the distribution of the best French authors among the academicians who are to make a note of such words and phrases as suggest general rules of correct expression, the entire academy to be the judge of what is thus presented. The preparation of four works—a dictionary, a grammar, a rhetoric, and a poetry—is projected. At every regular meeting, one of the academicians, in his turn, is to present a discourse in prose, reading or reciting it as he chooses. He may select any theme, but must restrict himself in delivery to fifteen minutes, or at most, thirty minutes. The rest of the session is to be devoted to the examination of works which have been presented to the academy, or to the prosecution of the four great tasks already mentioned. Every discourse before the academy is to be referred to two censors, who shall report within a month their observations upon it, and the author, within the following month, shall submit to the commissioners the corrections which he may have made in accordance with their suggestions. Similar steps are to be taken in respect to other works submitted to the judgement of the academy. Brief rules are laid down to make the criticism truly effective. The commissioners or censors are not to keep copies of the papers they examine, nor of their observations upon them; faults are to be pointed out with deference and courtesy. The corrections are to be received in the same spirit; the approbation of the academy will be expressed without praise, and in accordance with a prescribed formula. Works endorsed by the academy, after such scrutiny as has been mentioned, may be published by order of the French academy; but no academician may indicate his membership in the academy on the title page of a work not submitted to the criticism of his associates, or not approved by their action. The rules which the academy prescribes in respect to language or orthography must be followed by all academicians in prose and verse. All relation of the confidences of the academy, in criticism or praise, is forbidden under penalty of disgraceful and irremediable expulsion.

By these severe methods, the literary men in Paris, in the middle of the seventeenth century, endeavored to hold themselves and their countrymen up to a high standard of literary excellence. The results have been apparent from that time to this, in the clearness, the fitness, and the grace which have characterized French writers, not only those of genius and erudition, but those of humbler standing. In later days, other academies in Paris have shared with the French its lofty rank, and perhaps there is less reason now than there was two centuries ago, for such concentrated action in the improvement of the French language, and in the promotion of a pure style; yet no one can read the story of those primitive days without admiration . for the spirit which conceived this lofty idea of the benefits of literary criticism, severe and considerate, and which upheld the advantages of co-operative efforts in the advancement of letters. Among all the literary clubs of the world, none has attained to such acknowledged authority, none has come so near to immortality, none has had such wide-spread influence, as those which sprang into life at the magic tôuch of Richelieu two centuries ago.

BACTERIA.*

This class of organisms has lately come into great prominence on account of the relations they are known to possess to the causes of disease. In popular articles the term bacteria is less often applied to them than that of microbes or simply germs. They are spoken of as germs from the fact that it is due to their rapid growth and multiplication in the human system that many diseases are produced.

In scientific classification the bacteria belong to the class of organisms known as Infusoria, so called from the fact that they are always found in infusions of organic matter. It is only necessary to add a few leaves or stems of hay or shreds of meat to a glass of water and allow it to stand for a day or two to produce myriads of these organisms. Those who prepare them in this way for microscopic examination would do well to examine the infusion at stated intervals after the time of preparation; for there are very many species of bacteria, and each species has its own generation. In about twenty-four hours after the infusion has been made, a small drop of it placed under the microscope will usually be found to be teeming with minute organisms of a spherical shape. Twelve hours later many others of a rod shape, either straight or wavy, will probably appear. In the course of two or three days still others of a spiral or cork-screw shape will be present. It is difficult to imagine a scene of greater activity than that which presents itself to the eye at this period. The field of vision is teeming with incessantly active living forms darting hither and thither at every angle, and with the speed and directness of flying arrows. All of the several forms described above will probably be present, and all are constantly active except the small globular ones. These seem to have no power of motion.

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*From the Country Gentleman.

The causes of their movements were not well ascertained until within a few years. It is now well established that in the case of several forms the movement is due to the vibrations of cilia, of which there are only two present, one at each end of the body. Imagine a slender rod, straight or waved, with a delicate vibrating hair at each end, and you have an idea of the appearance of these forms.

When it comes to consider the size of bacteria, one must be prepared to receive some very extraordinary statements. The smallest (spherical in shape) are known not to be larger than one thirty-thousandth of an inch in diameter. It seems scarcely credible that bodies so exceedingly minute can be measured with approximate accuracy. But when it is considered that object glasses have been constructed capable of magnifying 2,500 diameters or, by taking the square of this, capable of enlarging the area of an object 6,250,000 times, it is readily seen that a minute body may be so enlarged as to allow its being measured with a near approach to exactness. Taking these organisms then at one thirty-thousandth of an inch in diameter, it follows that 900 millions of them could lay side by side on a surface an inch square. A film of matter one inch square, and one thirty-thousandth of an inch in thickness, if gathered into the form of a sphere, would be very much smaller than a drop of water. We arrive then at the astonishing conclusion that there are living organisms so exceedingly minute that more than a billion of them, or a number equal to the population of the earth, can exist in a single drop of water.

Not less remarkable is the exceeding rapidity with which these organisms multiply. It has been calculated by Cohn, the eminent German investigator, that a bacterium divides into two (they multiply by self-division), in the space of an hour, and that each one thus formed, itself divides at the end of a like time, and so on. At this rate, at the end of twenty-four hours a single organism will have amounted to about sixteen millions and a half; and at the end of a week, it will have multiplied to the incredible extent of requiring a number of fifty-one figures to express it. The same observer has expressed the results of his calculations in another way, by saying that "the bacteria issuing from a single germ would fill the ocean in five days."

The question arises, why these organisms do not overwhelm us with their abundance, seeing that they increase with such great rapidity. The answer is, that their increase is limited to the supply of food. As soon as the food material in a liquid containing them is exhausted, they perish.

Beside multiplying by self-division, they increase by means of spores. These are minute bodies, comparable to seeds, which form in the substance of a bacterium and subsequently develope into new beings. These spores remain alive after the death of the bacterium containing them, whether death be caused by the drying up of the water in which they are living, or by subjecting it to a boiling temperature. It is this fact of the resisting power of the spores to all ordinary destructive agencies that has caused so much difficulty in determining whence bacteria arise, whether, as in the case of all ordinary living things, from a parent organism or, as many for a long time supposed, by a process of spontaneous generation out of the organic matter of the infusion. For it was found again and again, that while all bacteria were destroyed by boiling the infusion containing them, yet, even if it were hermetically sealed before cooling below the boiling point, in a few days it would again be teeming with life. The supporters of the spontaneous generation theory claimed that this was irrefragable proof of the correctness of their view; but those who held to the contrary opinion were finally able to show, to the satisfaction of all, that the organisms which developed in the boiled liquid, sprung from spores which had resisted the high temperature.

These spores are known to be present in all ordinary atmosphere, floating about like fine dust. It is they which cause all forms of putrefaction, whether of animal or vegetable matter. No sooner is any dead organic matter left exposed to the air, than these spores settle upon it, and by their active vital processes cause that fermentation called decay. So that it has been well said that "putrefaction is a concomitant, not of death, but of life." As is well known, decay is prevented by cold; this is not due to any preservative quality in a low temperature, but simply to the fact that bacteria are not able to thrive except under moderate warmth.

As to the chemical decomposition of bacteria, they agree with all the lower forms of life in being made up of the nitrogeneous compound called protoplasm. They are like other forms, too, in consisting in structure of an outer transparent envelope, and a more granular inner part.

A FISH-EATING PLANT.*

Considerable attention has been attracted to the fish-eating habits of the common bladderwort, the first known plant which feeds not merely upon insects and such like inferior creatures, but upon the head and crown of the animal kingdom, the lordly vertebrates in person. Perhaps, therefore, some brief account of the murderous water-weed itself, and of its usual mode of proceeding in capturing its prey, may not be unwelcome at the present time. The plant was known to catch small insects and fresh water crustaceans in its tiny traps, and to use up their bodies as manure for its own development; but it was not yet know to be distinctly piscivorous. Last May, however, Mr. G. E. Simms, of Oxford, England, brought Professor Moseley a specimen of Utricularia in a glass bowl, in which were a number of young roach, just hatched out of spawn lying at the bottom. Many of the small fry were seen dead, held fast in the firm bladder jaws of the murderous plant. Professor Moseley being interested in this wonderful discovery of a fish-eating weed, secured another Utricularia and put it into a separate vessel, with fresh spawn and young fry of roach. In about six hours, more than a dozen of the fish were caught in the wee green gins. In most cases the fish were caught by the head, and when this is so the snout is pushed into the bladder as far as it will go, till it touches the opposite wall, leaving the tail of the poor struggling thing half free outside. Sometimes, however, the bladders catch the young roach by the tail, a fact which proves the truth of Mrs. Treat's view that the valve actually snaps at the prey, instead of merely allowing it to enter it passively. In one of Professor Moseley's specimens, a fish was caught by the yelk-bag, which fry carry in their early stages attached to their stomach: and in another instance two bladders had got hold of the same fish, one trapping it by the head, and the other by the tail.

Seen under the microscope the semi-transparent green traps, with the tiny silvery bodies of the dead fish half protruding from them, form very striking and beautiful objects. The big black eyes of the fish show out clearly, by the transmitted light, through the green wall of the cell that has caught them. Preserved in spirits, the specimens are less interesting, because then the bladder loses its green color, and the force of the contrast is considerably weakened.

After the fish have been for sometime trapped, they assume a slimy deliquescent appearance, and are rapidly absorbed by the glandular processes. As these processes project obliquely backward, Professor Moseley thinks it probable that they help to catch the fish and prevent them from escaping, in somewhat the same manner as the barbs of a hook or arrow, or as the backward pointing twigs of an eel-buck would do. Each fresh struggle and plunge must make the fish get deeper and deeper entangled in the trap, because the processes, catching in his gill or gill-slits, prevent him from moving backward, and compel him to move forward only.

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*Canadian Science Monthly.

One word as to the evolutionary history of this singular water-weed. It is a close relation of the beautiful pale green butterwort, whose graceful purple-blue blossoms are found on almost every bog or hilly brookside along the western side of our islands. Butterwort is itself an insectivorous plant, as are all its congeners; and Utricularia is only a butterwort which has taken to live in the water, and has so far adapted itself to its new conditions as to eat fish, as well as insects. By descent the butterworts are probably members of the primrose family, specialized for inhabiting marshy spots; while the Utricularia is a butterwort which has further adapted itself wholly to aquatic life in dirty ditches.

OUR CONSULAR SERVICE.

There is no more important service to the United States at the present time than that performed by our consuls resident in foreign countries. Greely's advice, "Go west, young men," is no longer applicable. The limits of the West have been reached and we are relegated to interior expansion. As agriculturists, we have overstocked the markets of the world with provisions. In this direction we cannot go further, for there are no purchasers at remunerative prices. Our inventors, in all probability, will continue to improve agricultural machinery and thereby lessen the cost of production. This advantage, however, will only enable us to successfully meet competition from other cereal-producing countries, like Russia and India, in European markets. We must, then, look in other directions than the present markets for the disposition of our surplus. These new markets are fortunately at hand south of us, not only on our own continent but in Africa. We are not likely to commit the folly of attempting to colonize, either in South America or Africa, but can, and ought to, form closer commercial relations with these countries. The late South American commission was well enough, but such temporary efforts do not meet the demands of the hour. We need permanent consulates, supplied with experienced and practical men who live in the countries to which our trade is to extend; men who can and will study their needs and advise us how to supply them. The agricultural resources of the countries named are immense and their development is at hand. As pre-eminently the nation of inventors, we can supply the growing wants which development and civilization imply. We have these southern countries at our door. Look south, with the eye on the ocean, and see how it narrows and brings Africa and Brazil close together. Look how West Africa and the southern Atlantic coast of our continent trend toward each other, their rivers emptying into the same ocean on opposite sides. Nor need the development of the vast countries south of us frighten our agriculturists. Their productions are different from ours and invite a change, rather than competition, the very thing needful to commerce. In order to learn the reason why Europeans have succeeded in obtaining the trade of Mexico, and countries further south, it is only necessary to compare and study the consular reports of these countries with those of our own government. Their consular offices are filled by men well qualified to study the wants and resources of the countries to which they are accredited. Their reports are full of the most interesting facts and suggestions bearing on the commerce and resources of the several countries. Their governments rightfully rely on the information thus obtained and, deriving therefrom practical benefit to their commercial interests, they extend to their consular officers proper aid and assistance. Of late years our consular service has improved and done some good work in the direction spoken of. We, however, have not yet given the attention to appointment, with reference to fitness, which is indispensable in order to derive all the benefits from our commercial agents which we are justly entitled to and should possess. Consular offices in foreign countries should be our homes, in the sense of meeting with a welcome when we enter them for commercial purposes or information. Our consular offices and surroundings should be a substitute for what Europeans call "factories," places where all national commercial interests center, are nursed and cared for. A few thousand dollars properly expended in work about a consular office, in pursuing the policy above pointed out, cannot help but redound to our benefit as a trading nation in a ratio beyond all relation to the disbursement.

WEATHER REPORT FOR AUGUST, 1885.

Prepared by Professor F. H. Snow, of the University of Kansas, from Observations Taken at Lawrence.

A cool, delightful summer month. The number of hot days was only half the average. This is the fourth successive August whose temperature has been below the August mean. The rainfall, wind velocity and humidity were each slightly above the normal amounts. The cloudiness was below the average.

Mean Temperature—73.22 degrees, which is 2.79 deg. below the August average. The highest temperature was 95 deg. on the 8th ; the lowest was 53 deg. on the 26th, giving a range of 42 deg. The mercury reached 90 deg. 7 times. Mean temperature at 7 a. m., 67.35 deg. ; at 2 p. m., 82.88 deg. ; at 9 p. m., 71.34 deg.

Rainfall—3 70 inches, which is 0.11 inches above the August average. Rain fell on 8 days. There were 3 thunder showers. The entire rainfall for the 8 months of 1885 now completed has been 25.54 inches, which is 0.29 inch above the average for the same months in the preceeding 17 years.

Mean Cloudiness—33.87 per cent. of the sky, the month being 1.43 per cent. clearer than usual. Number of clear days (less than one-third cloudy) 15 ; half-clear (from one to two-thirds cloudy) 12 ; cloudy (more than two-thirds) 4. There were five entirely clear days and none entirely cloudy. Mean cloudiness at 7 a. m., 44.52 per cent. ; at 2 p. m., 27.74 per cent., at 9 p. m., 26.13 per cent.

Wind—S. W., 28 times ; N. E., 19 times ; S. E., 19 times ; S., 4 times ; N. W., 14 times ; N., 6 times; E., 3 times. The total run of the wind was 9,124 miles, which is 690 miles above the August average. This gives a mean daily velocity of 294 miles and a mean hourly velocity of 12.26 miles. The highest velocity was 30 miles an hour, on the 20th.

Barometer—Mean for the month: 29.065 inches ; at 7 a. m., 29.089 inches ; at 2 p. m., 29.047 inches ; at 9 p. m., 29.060 inches ; maximum, 29.321 inches, on the 26th ; minimum, 28.778 inches, on the 6th ; monthly range, 0.543 inch.

Relative Humidity—Mean for the month, 71.2 ; at 7 a. m., 82.0 ; at 2 p.m., 53.6 ; at 9 p. m., 77.8 ; greatest, 97, on 11th ; least, 40, on 20th. There was no fog.

The following table furnishes a comparison with the 17 preceding Augusts :

August.	Mean Temperature	Max. Temperature	Min. Temperature	Hot Days.	Rainy Days.	Rain—inches	Thunder Storms.	Mean Cloudiness.	Humdity.	Number of Fogs.	Miles of Wind.	Mean Barometer.	Max. Barometer.	Min. Barometer.
1868............	74.17	93.0	57.0	3	6	8.32	5	42.87	..	0	......	.... ..	......	......
1869............	79.30	96.0	56.0	16	13	6.46	3	45.49	78.6	1	......	29.092	29.235	28.924
1870............	73.54	98.0	53.0	11	15	6.69	7	52.80	72.8	1	......	29.076	29.326	28.761
1871............	75.34	100.0	45.0	16	9	2.76	4	39.44	....	0	......	......	.....	......
1872............	77.27	97.0	53.0	13	13	4.71	6	33.76	72.0	0	8,698	29.120	29.290	28.867
1873............	79.38	104.0	56.0	24	6	0.90	2	23.87	57.8	0	8,190	29.134	29.330	28.974
1874............	83.45	108.0	65.0	26	6	1.00	6	24.95	49.0	0	10,099	29.076	29.289	28.916
1875............	72.50	91.0	55.0	2	7	2.90	3	32.79	68.1	0	9,484	29.080	29.328	28.919
1876............	77.70	94.0	63.0	17	11	4.45	6	26.66	72.4	0	8,235	29.103	29.402	28.794
1877............	71.01	97.0	51.5	7	5	2.30	3	29.57	72.0	0	8,572	29.076	29.289	28.916
1878............	77.44	98.0	56.0	14	7	2.22	4	19.19	74.6	0	8,188	29.045	29.230	28.879
1879............	75.48	99.5	49.0	16	5	1.03	5	28.92	63.8	1	6,835	29.053	29.386	28.801
1880............	75.45	101.0	50.5	14	10	7.93	5	45.70	70.1	0	8,863	29.070	29 349	28.859
1881............	81.23	104 0	62.0	29	5	1.57	2	31.29	62.5	0	7,991	29.050	29.178	28.875
1882............	72.55	95.0	52.5	11	6	0.09	1	32.37	72.4	1	7,463	29.116	29.305	28.935
1883............	72.04	92.5	52.0	1	6	2.12	4	39.89	77.0	0	7,640	29.158	29.353	28.885
1884............	71.14	98.0	47.5	3	11	5.49	4	48.16	77.8	3	9,392	29.110	29.405	28.849
1885............	73.22	95.0	53.0	7	8	3.70	3	33.87	71.2	0	9,124	29.065	29.321	28.778
Mean...........	75.84	97.5	54.3	13	8	3.59	4	35.09	69.5	0.4	8,484	29.089	29.314	28.871

EDITORIAL.

THE DEAD LANGUAGES AND EDUCATION.

The sounds of conflict are wafted toward us from the East. Pedagogue and Savant are waging the long expected war over the question of the use of Greek and Latin in the schools. The educational and scientific periodicals of that region are full of the matter and we are beginning to feel interested in the West. The truth is, it has long been shrewdly suspected by western people that the knowledge of a couple of languages, spoken for the last time over a thousand years ago, is of very little use to college-bred young gentlemen who find homes among them. It has been discovered that there is nothing in the acquisition of these languages which fits men for the active and pressing duties of life; the very duties that cannot be ignored or broken through by the average youth if he expects to achieve success. When the student leaves college it is very seldom that destiny or talent permits him to seek in "lettered ease" the only recompense for classical erudition. When he leaves his Alma Mater he stands face to face with the world and he cannot avert its buffets, or seize the prizes that await him, by showing familiarity with dead and buried languages. Whatever field of labor he may choose, whatever prizes he may strive to attain, his work henceforward must be practical, and he must bring a practical knowledge to bear, to reach them or to secure any degree of success in the race. In the words of a recent writer:

"However high one's ideal may be placed, however sanguine his hopes may be, the final test of success will be the real and practical.

It becomes a question of considerable interest, therefore, to what extent the ordinary collegiate curriculum provides those following it year after year with this practical knowledge. An examination of that curriculum will show that in every college of this country one study at least has been enforced which has no bearing upon a practical knowledge of the world or its business or industrial methods, and to this extent therefore every graduate is weighed down at the very beginning of the race. This study is Greek. It will show that, including the preparatory course, every student has devoted about five years to this deadest of all dead languages, which can only be made available, and even then to a limited extent, by those who intend to follow the theological profession. Even in this profession, the records would prove that the most successful savers of souls, which we take to be the prime motive of the ministry, have been those who had the least knowledge of Greek and the most knowledge of the vernacular. The examination would further show that Greek has been pursued during these five years to the exclusion of the sciences and practical arts by which the graduate must earn his living, even if he do not succeed in accumulating a competence. He has given several hours a day to the study of this dead language, which has little or no affinity with his own, to the exclusion of such studies as geology, chemistry, botany, electricity, natural philosophy, political economy, systems of finance, general history, literature, natural history, book-keeping, engineering, and other important courses, some of which must have an immediate bearing upon his future work, and without which he is poorly equipped for his struggle. His Greek will do him no good in the doctor's office, the lawyer's office, the newspaper office, the railroad office, the counting room, the manufactory, on the farm, or in the mine, or the bank. He cannot utilize it in political office or on the rostrum. He can accomplish nothing with it for his own good or for the world's advancement. He has lost a considerable part of his precious five years which should have been devoted to useful studies; and unless he has a very retentive memory he will forget in a few years all the Greek he so toilsomely acquired.

How much better, therefore, would it be if the time which is wasted upon Greek could be devoted to translations of the classics, to general history, to the arts and sciences, and to such modern languages as French and German, not to mention English. Four years of work in these would fit any young man for a good start in the race. It is too late, of course, to benefit those who have already graduated, and if their judgment could be taken, it would be almost unanimous in protesting against the time which was squandered in the study of an absolutely useless language. For the sake, however, of graduates who are to come and who must meet a constantly increasing competition in the struggle for a living, college curriculi should be cleared of all useless studies. The world grows more and more practical, and the college should keep pace with it. The studies which have come down from the days of the cloister should give place to those which will enable the graduate to take his place in the densely crowded and eagerly competing throng with some show of success for the prizes."

SCIENCE AND SPIRITISM.

In the August REVIEW a correspondent takes scientific men to task for ignoring, hitherto, the evidence of the truth of spiritualistic claims. While it is quite true that the leaders in modern scientific investigations, with a few exceptions, do not lend credulous, or even interested, attention to the wonders related of so-called mediums, it must be borne in mind that their training and settled habits of thought unfit them to enter this new and mysterious field. They cannot even admit the possibility of the facts alleged; for modern science has been directed undeviatingly towards the reduction of the chaotic phenomena of nature to a body of facts which exhibits the reign of law. Every cumulating discovery, or induction, in science, has helped along this movement until the savant has almost become a prophet—till cause and effect are each only the unknown terms of a problem which can be solved by a knowledge of the other. Now an admission that, side by side with the orderly procession of nature there exists a disturbing influence, an element which can operate to perturb and annul the laws which govern phenomena and set at naught the wisest induction, is more than can be expected from votaries of science. Such an influence is, in fact, inconceivable to the physicist.

Our correspondent will find in the English *Journal of Science*, for July and August, the opening articles of a controversy on this very subject. The controversy arose over a paper by the eminent zoologist, A. R. Wallace, (who is also a spiritualist,) entitled "Light;" and while his critic opens his side of the case with the statement, "It is no longer possible to ignore the phenomena known collectively under the name of Spiritualism," he proceeds to say: "Science is based upon what we, for want of a better name, term law. Spiritualism rests upon will. Science—and not merely our present Science, but any possible Science, so far as I can conceive it—takes its stand upon the causal nexus, upon the regular sequence of cause and effect. * * * * Now will,—finite will at least—is, I submit, the very antithesis of law. Where will—arbitrium—comes in, we have, of necessity, the arbitrary. The most of us, indeed, * * * have all along recognized one infinite unvarying Will as the ultimate cause of all phenomena. But such Will, being unchangeable and entering at all times equally into all phenomena, occasioned no difficulty. Nor has it been possible to deny that the wills of men and the lower animals * * were capable of interfering to a limited extent and in certain directions with the order of Nature. But, according to what was considered established in the earliest half of the present century, men and animals could act upon anything outside of themselves only where they were personally present, or where there was material physical connection between the agent and the object acted upon. * * * With the advent of Spiritualism all this beautiful simplicity has been swept away. If spiritualists are not mistaken, there are around us numbers of finite, invisible beings, of unknown powers and unknown intentions, capable of interfering with the order of Nature. * * * To me it seems that if these contentions are true * * * there are introduced, so to speak, into every equation a number of unknown quantities rendering it forever insoluble. We can only say 'such results will follow under certain conditions, if no spirits think proper to interfere.' * * * We are, in short, put to intellectual shame and confusion."

There is another view to be taken of this question which may possibly explain the antagonism of scientific men toward any phase of occultism. We have only just escaped, during this century, from the domination of a thousand superstitious beliefs which weighed upon our ancestors. Ghosts, elves, witches, goblins, were to them the most appalling realities. Their personality entered into the operations of nature, and people forgot the tempest and the plague in horror at the cruel intelligences that animated them. Against these popular superstitions Science made a halting and painful progress; yet every step forward cleared men's eyes more and more to see in the phenomena around them no potency or motivity that did not spring from the operation of the laws of Nature. In time Science was victor over superstition; and is it strange that its votaries are averse to fighting over again the battle with "chimeras dire?" No longer suffering from "the ever haunting dread of the interference of spirits," thanks to science, we cannot return to the "bondage of the Middle Ages."

When spiritualists can harmonize their beliefs with the known and attested facts of science, then they will become science and receive the sympathetic investigation of scientific men.

THE SPENCER-HARRISON IMBROGLIO.

Prof. Youmans' article in the August number of the *Popular Science Monthly*, on the "Suppressed Book," will fail to convince many that the publication of Mr. Harrison's letters, without his consent and with adverse comments, was the fair thing to do; yet the attitude of the English press, and of Mr. Harrison himself, is so extremely unfair that the American public will feel little inclined to censure the act very strongly. The truth seems to be that there was more heedlessness in the matter than desire to do Mr. Harrison an injustice. It is true that it was the duty of the publishers to confer with both parties to the controversy, instead of with Mr. Spencer alone, before publishing; but Prof. Youmans is such a staunch friend of Herbert Spencer, and such a thorough disciple of his doctrines, that he thought only of extricating his leader from the brilliant dialectics of the great Comtist. His mind being single in this purpose, it never occurred to him to communicate with Mr. Harrison on the subject; he was too strong a partisan to look at both sides of the shield, especially as his desire to see Mr. Spencer righted was mingled with considerable indignation over Mr. Harrison's management of the controversy.

Now no one who knows Prof. Youmans, personally or by reputation, would for a moment think him guilty of moral obliquity in any sense. The bad taste and bad manners of Mr. Harrison in designating so eminent a man by the appellation of "cute Yankee editor," as though he were a type of Dickens' Yankee editor in Martin Chuzzlewit, cannot give much credit, in this country, to Comtism as the religion of humanity; and when this is supplemented by innuendoes that covetousness was the motive of Professor Youmans rather than partisan enthusiasm, he puts himself farther in the wrong than his opponents have ever been.

In a recent article in the *Century* it is stated that the only distributing points in the West, worthy of the name, are Chicago and St. Louis. Now Kansas City was so well satisfied with its career in this direction that it passed the matter by without comment; well knowing the profound ignorance prevalent in the East about Western affairs. But Minneapolis and St. Paul became testy at once, and, assured the effete East in the most solemn manner that they could be found on the map by a very cursory examination. The *Century* published the letter of correction good-humoredly, and thus what threatened to be a serious complication has been peaceably averted.

Dr. W. G. Thompson in the *Popular Science Monthly* for September tells a rather apocryphal story of the West, *apropos* of the universal interest taken in the germ theory. He says: "The germ appeals to the average mind: it is something tangible; it may be hunted down, captured, colored, and looked at through a microscope, and then, in all its varieties, it can be held directly responsible for so much damage. There is scarcely a farmer in the country who has not read of the germ-theory. A cow-boy in Arizona was shot dead in the saddle recently, by a comrade, for the insult implied by calling him a 'd——d microbe'!"

The appearance of the Review this month is the natural result of the encouragement extended to it. The good will and interest manifested by the public in its success will, if continued, enable us to publish a magazine worthy of Kansas City and of the times. Its late issue is attributable to a "lost car" which contained the paper manufactured for it, and which was not "found" till almost three weeks from the date of billing the paper.

Through an error, the article in the last number of the Review on "Intellectual Love" was credited to Frederick Harrison; the author's name is Frederick Hartman, and he does not relish being translated, *nolens volens*, into a follower of Aguste Comte.

CORRESPONDENCE.

THE FATUITY OF STRIKES.

To the Editors of the Review:

There is a spirit now rife in this country which presents an aspect so hostile and menacing to our national prosperity that we cannot afford to permit it to gather strength with impunity. It is a spirit that is totally opposed to all political virtues; that destroys patriotism and converts submission to law into hypocritical appearances; that places above the duties of citizens, and the laws of the land the sanctions of secret conclaves and the commands of mysterious magnates. There is something radically wrong with any movement which disregards the laws, or finds them in the way of its purposes; that surrounds its proceedings with mystery and seeks to gain its ends by secret codes and inquisitions. Such a movement would seem to have little to recommend it to the prosperous and intelligent; but there are so many specious claims advanced in its favor and such desire on the part of the American people to do justice to the oppressed, that the greatest wonder is that we don't all become strikers on the least occasion. For there is no doubt that labor has many just causes of complaint against organized capital. When a rail-road corporation seeks to realize from $20,000,000 worth of property an income quite adequate for double that investment by watering its stock fifty per cent, the laborer may be pardoned for feeling exasperated when his wages are reduced to accomplish this. But because defective laws permit such an outrage is it sensible or politic or virtuous for the laborer to expatriate himself—to show but a seeming obedience to the laws of his country while he follows blindly the dictates of his secret leaders? Because the rich do wrong must the poor follow suit? It has been frequently said that the virtue of a nation could be found alone amongst its humblest citizens; and it would be an unpleasing reflection to conclude that the lust for gold has corrupted all, rich and poor, high and low, alike.

There is another feature of this question which affects more nearly the laborer than he is likely to believe. It is a fact that when an individual gathers a little property together, he grows conservative, less inclined to applaud the lurid oratory of popular agitators. He has something at stake in the community, something for which he desires the protection of equal laws. When trouble comes, when the frenzy of riot and ravage sway the mob, such a man may be found at his post in the militia or in some other way testifying his respect for order.

The mechanic whose thrift and economy have given him a start on the road to competence is poor material for the labor agitator to approach; such advisers are better listened to by a mob like the one recently gathered in Chicago which announced so pathetically that "our children are crying for bread" while it emptied three hundred casks of beer. The man who drinks a glass of beer while his child is starving generally is a fair type of those who organize labor associations and live without labor from the hard wrung contributions of their dupes.

No other class is more hostile to the spirit referred to than the farmer. He cannot afford to have the business of the world stopped for a day. Every obstruction thrown in the path of commerce reacts on the farmer disastrously; and he would not willingly see its avenues closed by the acts of misguided, desperate and unthrifty men, especially when those acts are performed in open defiance of law and at the behest of unknown authorities. The farmer, more than any other citizen, needs the protection of law; and he will never wink at proceedings which savor of a new reign of terror and a later Jacobitism.

It is apparent from the nature of the case that the laborer is throwing away the sympathy and support of just the classes upon whom he must depend for help in extremity. If the present course of the Knights of Labor, and other organizations with similar high-sounding names, is pursued to its logical and inevitable conclusions, many of us will live to see the day when cordons of soldiers will replace the present unobtrusive executors of the law and every manufacturing town will have its garrison to enforce peace and order with the bayonet. This would be a sorry result for a land which promised so much liberty; which trusts so much to the intelligence of its citizens.

But "desperate diseases require desperate remedies;" if the ulcer on the body politic will not yield to compress, or plaster, the cantery or the knife are the only resources left.

C. H. D.

PHRENOLOGY DEFENDED.

New York, Aug. 29, 1885.

Messrs. Editors:

Your correspondent, Dr. Browning, can be acquainted with the affairs of the Fowler & Wells Co., and with the *Phrenological Journal*, etc., but in a small degree, as Mr. O. S. Fowler has had no editorial connection with the *P. J.*, and no practical interest in the concern for upward of thirty years. He in fact, withdrew from the old firm in 1855; and since that time has published books on his own account. As regards our estimate of authority, besides personal observation, we regard the general drift of neurological conclusion to be favorable to the opinions held by Dr. Spurzheim and George and Andrew Combe. Dr. Browning has mentioned Prof. Caldwell in terms of respect, and we cannot except him from the roll of great Phrenologists. One who has read our magazine during the past fifteen years will testify to the fact that the whole field of modern neurology has been represented, and the most recent developements in pathology and experiment have been noted. There are some who have chosen the pursuit of lecturer, and gained reputation and money, but who contribute little to scientific progress. Such men may be acceptable to a large class of people, but you know, gentlemen, that their opinions are not always approved by those who are in the advance.

H. S. Drayton,
Ed. Phren. Jour. and Sci. of H.

SCIENTIFIC AND INDUSTRIAL NOTES.

APICULTURE.

An apicultural station has recently been established at Aurora, Ill., in connection with the Entomological Division of the Department of Agriculture. Mr. Nelson W. McLean has been appointed to take charge of the station, and Prof. Riley has instructed him to pay particular attention to the following subjects:

1st. To secure the introduction and domestication of such races of bees as are reported to possess desirable traits and characteristics; to test the claims of such races of bees as to excellence and to prove by experiments their value to the apiculturists of the United States and their adaption to our climate and honey producing flora.

2nd. To make experiments in the crossing and mingling of races already introduced, and such as may hereafter be imported, and by proper application of the laws of breeding endeavor to secure the type or types best adapted by habit and constitution to the uses of practical bee keepers in the United States.

3rd. To make experiments in the methods of artificial fertilization, and if possible demonstrate the best process by which the same may be accomplished.

4th. To test the various methods of preparing bees for winter—such as stimulating late breeding, removing the pollen from the hive in winter, feeding on sugar syrup, watering during long confinement, the stimulating of early breeding in the spring, the control of the swarming impulse and the prevention of swarming.

5th. To gather statistics concerning the bee-keeping industry in the United States, and obtain an approximate estimate of the number of colonies of bees kept, the number of pounds of wax and honey produced in the several states in the United States, and the value of the same.

6th. To make experiments with and observations concerning varieties of honey producing plants for bee-forage.

7th. To study the true cause or causes of diseases yet imperfectly understood and the best methods of preventing or curing such diseases.

8th. To obtain incontestible results by intelligent experiments upon scientific methods as to the capacity of bees, under exceptional circumstances, to injure fruit: i. e. to set at rest the ever discussed question of bees vs. fruit.

ORNITHOLOGY.

In response to a Memorial presented to Congress by the American Ornithologists' Uunion, and through the efforts of others interested in the subject, a branch of Economic Ornithology has been established under the Division of Entomology of the Department of Agriculture; and Dr. C. Hart Merriam has been appointed as Ornithological Agent to take charge of this Divisional work.

The scope of investigation will cover the entire field of the inter-relation of birds and agriculture, particularly from the entomological stand-point. The inquiry will relate primarily to the food-habits of birds, but will include also the collection of data bearing on migration and geographical distribution of North American species. In this last inquiry the Department hopes to have the co-operation of the American Ornithologists' Union, Dr. Merriam being Chairman of the Committee on Migrations of said Union. The co-operation of farmers is solicited, and those having knowledge of food habits which are beneficial or detrimental to agricultural or horticultural interests are requested to communicate the same to Dr. Merriam.

The assistance of persons willing to aid in the collection of birds' stomachs is particularly desired.

Information is also wanted concerning the presence and habits of the so-called "English Sparrow" (Passer domesticus) in the Southern States and in the region west of the Mississippi.

Dr. Merriam will have his headquarters at Sing Sing, N. Y., until October 1, 1885, and after that date at the Department of Agriculture, and should be addressed accordingly.

ASTRONOMICAL NOTES.

A NEW COMET.

A telegram received at Harvard College Observatory, on September 1, from Prof. Swift, of Rochester, announced the discovery of a suspicious object by Mr. W. R. Brooks, of Phelps, N. Y., and requested verification of the same. The rough position sent was R. A. 13h. 20m., Decl. -|-37o.

The evening of September 1 was cloudy at Cambridge, and the comet was not seen. September 2, Prof. E. C. Pickering found the comet, and the following approximate position was circulated by telegram and cable last night:

September 2d, 9h. R. A. 13h. 42m. Decl. -|-36o 37 min.

Daily motion in R. A.—3m. 12s., in Decl. -|-18 min.

The comet is of about 9th magnitude, with circular nebulosity 2 min. in diameter, some central condensation and no tail.

VARIATION IN THE NEBULA OF ANDROMEDA.

A cable message, received September 1 from Dr. A. Krueger, of Kiel, announces a variation in the great nebula of Andromeda, which was seen by Dr. E. Hartwig, a bright, star-like nucleus having been developed. The phenomenon was observed September 1 by W. H. Numsem, of Baltimore, and on September 2 by Prof. Pickering at Cambridge, the latter of whom secured a series of spectroscopic and photographic results.

ASTEROID PETERS (249).

A telegram received at Harvard College Observatory, on August 17., announces the discovery, by C. H. F. Peters, Clinton, N. Y., of an asteroid of the 12th magnitude. The discovery position is as follows:

August 16d. 14h. 40m. Wash. M. T. R. A. 21h· 58m, 40s. Decl. —15o 51min.

Daily motion, 60s. and on parallel.

PLATINUM.

The principal portion, or, in fact, nearly all the platinum used in this country, comes from the famous mines of the Demidoff family who have the monopoly of the production in Russia. It is all refined and made into sheets of various thicknesses and into wire of certain commercial sizes. At one time it was coined in Russia, but it is no longer applied to that use. We have obtained some very good crude platinum ore from South America and have refined it successfully, but the supply from that source is very small.

A popular error respecting platinum is that its intrinsic value is the same as gold. At one time it did approximate to gold in value but never quite reached it, and is now only worth $8 to $12 an ounce, according to the work expended upon it in getting it into required forms and the amount of alloy it contains. The alloy used for it is iridium, which hardens it, and the more iridium it contains the more difficult it is to work, and consequently the more expensive. When pure, platinum is soft as silver, but by the addition of iridium it becomes the hardest of metals. The greatest difficulty in manipulating platinum is its excessive resistance to heat. A temperature that will make steel run like water and melt down fire clay has absolutely no effect upon it. You may put a piece of platinum wire no thicker than a human hair into a blast furnace where ingots of steel are melting down all around it, and the bit of wire will come out absolutely unchanged, as if it had been in an ice box all the time. No means have been discovered for accurately determining the melting temperature of platinum, but it must be enormous. And yet, if you put a piece of lead into a crucible with the platinum, both melt down together, at the low temperature that fuses lead, and if you try to melt lead in a platinum crucible, you will find that as soon as the lead melts the platinum with which it comes in contact also melts and your crucible is destroyed.

A distinguishing characteristic of platinum is its extreme ductility. A wire can be made from it finer than from any other metal. A sample is shown, gauge of which is only one two-thousandth of an inch, and it is practicable to make it thinner. It has even been affirmed that platinum wire has been made so fine as to be invisible to the naked eye.

The draw plates, by which these fine wires are made are sapphires and rubies. You may fancy how delicate must be the work of making holes of such exceeding smallness to accurate guage, too, in those very hard stones,

But delicate as is the work of boring the holes, there is something still more delicate in the process that produces such fine wire as this. That something is the fitting of a long point on the wire to enable the poking of the end of it through the draw plate so that it can be caught by the nippers. Imagine yourself fitting a long tapering point on the end of a wire only one eighteen-hundreth of an inch in diameter, in order to get it through a draw plate that will bring it down to one two-thousandth.—Mining Review.

JAPANESE TECHNICAL APPARATUS.

The question of providing instruction in physical science in technical schools without costly apparatus was recently the subject of discussion before the Society of Arts in London, and an illustration of how this might be done was given from the work done by Prof. Gutherie, at South Kensington. The subject is referred to again in the issue of the Journal of the society for the 26th ult., in which an interesting account is given of the progress made by the Japanese technical schools in providing inexpensive appliances. The Journal says: "The Tokio school trains teachers to be sent to poor villages, where a collection of apparatus such as still in this country is regarded as a benefiting equipment for a labratory would be out of the question. Hence we see bamboo canes, corks, scraps of wire, old bottles, broken tools, flower-pots, in short things that in every village would go to the rubbish-heap, utilized for the construction of apparatus. To those who have not seen in the South Kensington museum what Prof.

Gutherie's pupils have done, it would appear almost incredible what those Japanese can do. They do not come up to the South Kensington work in point of finish and elegance, but this is not aimed at. To find the handiest material for doing just what is wanted is the point. No doubt the specimens exhibited in the country are picked, it is natural that they should be so, still they are representative. What simpler material for the construction of an electric machine could be thought of than two old beer bottles, one for the cylinder and the other as an insulating stand, a fragment of an old saw, an old bell, some long sharp nails driven in a row, some old handles and other bits of wood? Or, again, for a mercural air-pump, some short lengths of glass tubing, bottles, a tumbler, sealing-wax, string and caoutchouc? Yet, somewhat clumsy though it looks to our eyes, accustomed to delicate and finished instruments, it illustrates the manner of its acting even if it should not be capable of working with great perfection. Then there is a simple polariscope, a Coulomb's torsion balance, and a Cartesian diver, consisting of an eggshell, a small stone, a bottle and cover. A model to illustrate the principle of an equatorial telescope is especially simple. It belongs to another section, but illustrates simplicity. Into the cork of a bottle is put a short piece of wire, on to which is placed another cork. From this springs another wire, on to which a soft wax candle is pushed. Why a bamboo cane is not used instead of a wax candle is not apparent, but the principle is the same,

For chemistry the arrangments are just as simple, A retort stand is made from bamboo, a piece of wire-work ash-sifter for the retort to rest on, and a strip of bent bamboo to form a clip. Where bamboo cane can be used instead of glass, it appears to be done; for example, in place of a glass jar with a nozzle for burning hydrogen, a large hollow cane, stopped at one end with a tobacco mouth-piece, is used. Thus, perhaps, it is really hardly so simple, though, as the usual way of generating the hydrogen in the same bottle as that from which it was burned. Stoneware jars, however, seem in all cases used as retorts, for no glass retort is shown. Teachers often say they cannot show their pupils the decomposition of water; but here is a Buren battery —one 'cell' at least—made of a glazed pot, a porous pot, a coil of zinc and a stick of charcoal. The 'collector' is equally home made, except that the two test tubes probably have to be purchased, and these are cheap enough, it is in the putting together the skill lies."

PENETRATION OF LIGHT IN WATER.

Experiments have recently been conducted in the Lake of Geneva and elsewhere by M. M. Fol and Sarasin to determine the depth to which light penetrates in its waters. The method of experimenting was to submerge photographic plates of gelatine bromide of silver at various depths and develop the luminous images produced on them by rays penetrating from the surface. A coating of bituminous varnish, easily removable by alcohol or spirits of turpentine, served to guard the sensitive layer from the chemical action of the sea water. The rays affected the sensitive surface through a layer or back plate of glass. Oxalate of iron was employed as the developer, allowed to act for ten minutes. In clear sunlight during March and near Ville-franche-sur-Mer, they obtained images to the depth of about 400 meters. The images increased in strength as the depth diminished. In the Lake of Geneva they, however, only obtained images to the depth of about 200 meters, or half as far; and the authors conclude that in winter months sunlight does not penetrate farther than 200 meters, while in the Mediterranean it stops at about 400 meters deep.

COMMERCIAL VALUE OF THE EUCALYPTUS TREE.

The eucalyptus tree has been domesticated in Mexico with considerable success. It could hardly flourish better even in its native soil in Aurtralia. Naturalists are surprised when they behold the giant trees in the Zocalo and other portions of the city and learn that they are but a little over sixteen years old, for their size leads them to suppose they had grown twice that number of years. The wonderfully rapid growth, the hardness and durability of the wood, with its value for a wide variety of mechanical purposes and for fuel, and the sanitary qualities of the tree as a preventative of malarial disease where it is planted, make the eucalyptus one of the most valuable gifts contributed by one country to the flora of the world. Extensive forests of it are growing in Italy, in North America, in California, and in other countries where the climate permits its culture. In California its cultivation yields greater profits than are afforded by the vineyards; grape-raising being one of the most profitable industries of that flourishing state. It is valuable as timber for all sorts of mechanical purposes. For railway construction and maintenance it would be of great worth.

FORMATION OF COAL.

There is in Phœnixville, Chester county, Pa., an exemplification of the operations of nature as displayed in the formations of coal, where it can be found in actual process of transformation from vegetable matter to a soft, soapy carbonic substance, and the latter gradually changing to lignite and then again into the soft coal of the bituminous form. Go along the Pennsylvania Schuykill Valley railroad, between the first passenger station of that system and the new one, and you will find a force of men cutting down the bank there, 18 or 20 feet high, and amid those rocks, perhaps 3 feet above the railroad track you will observe a black seam. The black seam is a laboratory of nature. From above, before the Morgan house was removed and the surrounding bank, big trees sent their roots down through the crevices of the rock till they reached the seam in question, which, in time, they filed with roots and fibres. The trees above died and the roots and fibres confined in the seam began to work, chemical changes took place, carbon was evolved and coal was the result. The labratory was opened by the building of the railroad before the slow process was fully completed, so that you can find there to-day the vegetable and carbonized matter and lignite and coal all together, proving, indeed, the popular thought that coal grows is true.

ASSYRIAN COLORS.

The colors which have revealed themselves during Layard's excavations at Nineveh, Wm. Linton says in the Architect, display sufficient evidence that they are not inferior to those of the ancient Egyptians, either in number, variety or brilliancy. Instead of the common earthy bole or reddle of the latter people, the Assyrians have left us a color almost equal to vermilion itself. The monochrome pictures which represented the chaldremes on the wall (Ezekiel xxiii 14,) are said by Gesenuius, the Septuaguint, and the vulgate, to have been painted by sinoper or rubica, a native earthy oxide, like Indian red; while both the great English versions of the Bible now in use, as the rabbis, translate the word at issue ("shashar," Jeremiah xxii, 14,) vermilion. At Khorsabad it appears that the red approached in hue to that brilliant color, while the sculptures at Nimroud exhibited a bright crimson or lake tint. Layard thinks there is no doubt of their having made great use of vegetable colors; the materials of which are so plenteous in the vicinity of Nineveh. The rapid evanescence of some specimens of blue and red on plaster which were bright and perfect in color when first exposed, would appear to favor a vegetable origin, as no susceptibility of the kind is known to characterize any mineral reds or blues with which we are at present acquainted. Layard claims for the older Assyrian period the same colors which have been attributed to the early times of the Egyptians, viz., blue, red, yellow, black and white. He also speaks of a green on the earlier monuments of Nimroud, and of green, purple, violet, brown, etc., enameled in paintings of figures on bricks at the northwest palace. In allusion to the analysis of Sir Gardner Wilkinson's specimens of the Alexandrian blue, by Dr. Ure, Layard conjectures that the coloring principle may be the same, but affirms that the Assyrian blue is much the brighter. He concludes that the color was derived from copper, as he found an old mine of that ore in the neighborhood of Nineveh. Layard considers the greens of Assyria to be similar to those of Egypt, which are in many instances composed of iron ochre and copper blue. The yellows and blacks also he conceives to resemble those from Egypt; and as specimens of the latter class of pigments he mentions calcined bone and black iron ochre. The whites are of alabaster and gypsum. At Khorsabad the French antiquarian, M. Botts, found green, red, black, white, yellow and blue—the latter very lively in color.

THE ORIGIN OF THE RAT.

The origin of the rat, like the birth of Jeames Yellowplush, is wrapped up in mystery. The ancients, according to a learned writer, quoted by M. Eugene Roland in his "Faune Sauvage," knew not the rat. Their condition was more gracious. But it is hard to be certain about the fauna of the ancients. When they use a word meaning mouse they may have had field mouse or common mouse or perhaps even the rat in their minds. Herodotus tells, on Egyptian authority, the same tale of an army defeated by mice who gnawed their bowstrings as the Creek Indians tell of rats in their cosmogonic legend. This legend was fairly written in red, on a skin, and was kept during the last century in the Georgia office. Where is it now?

The Chinese have precisely the same story only they, like the Creek Indians, assign the victory to rats, not to the mice of the old Halicarnassian. Perhaps Herodotus meant rats, he knew nothing of cats till he went to Egypt, and about rats he may have been equally in the dark. Rats are not uncommon in Shakespeare, but Buckland says Genner (1587) first mentions the black rat. This, though older than the brown rat, is not apparently aboriginal. The Welsh name for rat means "French mouse," and perhaps the rat, came over with the Conqueror. An accomplished author on micromamologie thinks the rat was brought to Europe (involuntarily, no doubt) by the Crusaders. The brown or so-called "Norway rats," devour the black ones, and are later comers.

If a well known character was really "a rat in Pythagoras' time," the argument against rats being known to the ancients falls to the ground, and Shakespeare certainly thought that rats were common in the heroic age of Denmark. Rats in the zoological gardens are a good deal to be pitied. We all know the elephant of the fable. She one day trod unwittingly on a partridge, and killed it. Soon afterwards she found the nestlings of the partridge. "Poor little things!" said the elephant; "I, too, have been a mother;" and, with the kindest intentions, she sat down on the nest. In the same way the rhinoceros, never dreaming of harm, lies down on rats in his house, and compresses them quite flat. Such is their doom—an example, as far as it goes, of the ruthless laws of nature, and the survival of the fittest. The instinct of rats teaches them to shun a falling house; but not, alas! to avoid a sleepy rhinoceros.

COAL IN MEXICO.

A few years ago, in discussing the future of Mexico, it was no uncommon thing to find the leading journals of the country indicating that the advancement of Mexico must ever be retarded from the lack of coal within its borders. It was stated positively that it was practically without coal, and that none had ever been discovered which could be utilized. More recent investigation and a better knowledge of the facts show that Mexico has an ample supply of coal for all purposes, and it would not be surprising if its resources in this direction should be found sufficient to revolutionize the coal trade particulary of the Pacific coast.

A recent investigation of the coal trade in Sonora shows that a large anthracite coal field there exists, extending continuously from the summit of the Las Bronces range of mountains to the Yagui river, that contains 108 square miles more than the five anthracite basins of Pennsylvania and is as great as the aggregate area of all the coal field of England. It is claimed, also, that this coal is superior to the anthracite of Pennsylvania, having from 90 to 92 per cent. carbon, to 3½ to 5 per cent. waste, and leaves no clinkers when burned. In many places the workable seams exposed by erosion and meteoric agencies are from four to five feet thick; some ten, and others sixteen feet of excellent coal. What is true in regard to Sonora will probably be found duplicated in every other portion of this great country, the resources of which as yet are practically unknown. It is stated that English capital has already large interests in the coal fields of Sonora, and preparations are being made to build railroads and to otherwise utilize the immense treasures here discovered.

THE FIRST ATLANTIC CABLE.

Mr. Cyrus W. Field, celebrated the 27th anniversary of the laying of the first Atlantic cable, lately, by a complimentary dinner to about two hundred distinguished personages, at the Star and Garter Hotel, Richmond (England). Mr. Field presided, and amongst those who were present, we notice the names of Sir Lyon Playfair, M. P., Mr. G. Shaw-Lefvre, M. P.; Sir William Thomson, Sir Charles Bright, Sir James Anderson, Sir Henry Thomson, Sir George Elliott, M. P.; Sir Daniel Gooch, M. P.; Sir Julian Goldsmid, M. P.; Sir Arthur Otway, M. P.; Vice Admiral Sir George Richards, M. P.; Mr. George Reuter, and many others. The loyal toasts, English and American, having been honored, the chairman gave "Success to the Atlantic cables; may they perpetuate the peace, friendship, and prosperity of two great kindred nations." He gave in brief terms, the history of the difficulties encountered in laying the first cable, and described the success eventually achieved. They had covered both earth and sea with a subtle and instantaneous means of inter-communication, which was destined, in its far reaching consequences, to bind together all the great English speaking family, and to play an important part in advancing the general well being and progress of mankind. Senator Hawley of Connecticut, Sir George Elliott, and Sir James Anderson responded; after which the chairman proposed the toast of "The men of science and enterprise to whom sub-marine telegraphy is so largely indebted," coupling with the toast the names of Sir William Thompson, and Sir Charles Bright. The "health of the chairman," proposed by the Lord Mayor, brought the proceedings to a close.

A PACIFIC OCEAN CABLE.

The following curious remarks are from the pen of the San Francisco correspondent of the Electrician and Electrical Enquirer of New York. What a boon tc commerce, and what a course of general satisfaction to the reading people of the world would a cable from the Pacific coast to China be; say along the 40th parallel to the Japenese Islands and Shanghai. In this way we could have pure and unadulterated war news, which must now be taken with considerable allowance after passing through the sieve of a British censorship. This cable was contemplated some eight or nine years ago, and the United States steamer Hassler took soundings, but because it did not promise an abundant return for the money to be expended, it was allowed to drop. In a few years when Russia will control the Persian Gulf and the Sea of Oman, she may unite with China in establishing direct cable communication with the western hemisphere: unless England forestalls her by connecting Victoria B. C. with Yeddo Japan. England very seldom unites with other countries in promoting any scheme for the public good unless she is to derive the greatest benefit therefrom.

A CEDAR GROWING FROM AN OAK.

Mr. J. Brundage, sends from Challenge Mill, Yuba county, to the Sacramento Record-Union, a photograph taken by him of a singular growth. It represents a mountain oak, two feet in diameter at the ground and fifteen feet in height, at a point where it appears, at some time quite remote, to have been broken off. Each side of this break, which evidently left a cup-like indentation, grows out on one side and up on the other limbs bearing the usual foliage. But from the point of the supposed break rises out of the oak, and growing firmly from it, a cedar tree, which is about thirteen inches in diameter, and rises straight as any arrow between twenty-five and thirty feet. It is as shapely and handsome a cedar as one could wish to see. It is situated about three miles from Challenge Mills, and is in the high Sierras. It is a remarkable curiosity, and is so regarded by all who visit it. Whether the cedar grows after the manner of a graft, or whether it has a tap root extending down through the oak, are questions to be determined. Only one instance recalled of a similar growth is in the Calaveras grove of big trees, where some years ago was seen a small sugar pine growing out of the fork formed at a great height by a limb and the trunk of the giant sequoias. Evidently the sugar pine seed, being there lodged, found sustenance sufficient after germination to feed the pine growth.

A FIRE-PROOF SUIT.

A man in a helmet suit set fire to a house at Oak Point Tuesday evening, says the New York Herald, and going amid the flames cooked a steak upon a burning window sill, and, sprinkling it with red pepper, ate it without a sneeze. Thirty gallons of petroleum had been sprinkled over the inside building, and when this ignited the heat became so intense as to drive the spectators away into the shade. There were no terrors in this for the incased individual however, for he threw away his dishes, and resting himself upon a crackling stool opened a bottle of wine, and lighting a cigar, drank and smoked until his table, stool and wine, and cigar were all consumed. There was an opening in the face of the helmet, through which the inner man was refreshed and after these diversions the opening was closed, and with a yawn the man lay upon the floor with a seething log for a pillow and proceeded to take a nap. But there was too much excitement outside to allow of quiet, undisturbed slumber, and arising with a petulant air the would-be sleeper seized a fire brand and darted forth to drive his tormentors away. The man is a native of Sweden, named Ahlstom. He invented the suit, the outside of which is made of mole skin and the inside of rubber. A small hose is used to fill the space between the parts with water; and another hose supplies the man with air from outside the burning building. The act is merely curious, not of practical value.

A THINKING MACHINE.

A cultivated gentleman of French descent residing in Gallipolis, Ohio, who has been an invalid for several years, has just received a patent for an invention of more than ordinary merit and of a peculiar character. It excites the wonder and admiration of all who behold it. Many declare it the equal, in general untility, of the sewing machine or telephone. It is perfectly wonderful in its operation, and yet so simple in its action that a child can learn to use it in a few minutes. It consists of a pair of scales which announce with unerring accuracy the value of any number of tons, pounds or ounces at any price. For instance, a ham is placed on the scales. Its weight is twelve and three-quarter pounds, and the price is 12½ cents per pound. A sliding weight is moved along the scale beam until the ham is balanced. In the notch where this weight stops will be found the worth of the meat in dollars and cents to a fraction. Again, suppose a grocer is asked for 50 cents worth of tea. The price is 78 cents. One indicator is set at fifty, the amount wanted, the other at seventy-eight, the price of the tea. Tea is poured into the scoop until the scale is balanced, when the quantity of tea is found to be correct as if several minutes time had been consumed in making the calculation.

A MONSTER GLOBE.

Detailed accounts are given in the Berlin and Paris papers of a monster movable globe made of copper, the work of a blind clockmaker, and on the construction of which seventeen years were spent. The globe represents the earth, and like it, turns on its own axis by means of a mechanism; an artificial moon moves round the Globe in twenty-eight days and six hours, while a movable metal band on which the hours are marked indicates the mean time in the different parts of the earth. Round the upper portion of this immense globe, which weighs a ton and a half, and whose surface measures 126 feet in diameter, spins a railroad car capable of holding six persons, and which serves to give a better view of the regions of the North Pole. The painting of the globe is done in oil, and necessitated the employment of two men during an entire year. The sun is represented by an intense Drummond calcium light, which enables the spectator to watch intelligently the origin and change of the different periods of the day, the early dawn, the twilight, eclipses of the sun and moon, etc.

AMERICAN EXHIBITION AT ROME.

A permanent exhibition of United States products will be opened at Rome, Italy, on November 1st of the present year.

Rejuvenated Italy is a non-manufacturing country with a population of 30,000,000, and the value of its yearly imports is about $260,000,000. The density of population, it will be readily understood, is of advantage to exporters in more than one way; and its almost insular position places its chief markets in easy communication by sea with the rest of the world. To the American exporter the country presents a population equal to that of all the South American states, and confined to a territory of comparatively small proportions and easily reached at nearly all points. In addition to this, a comparison of its imports with those of the countries to the south of us show that they equal those of Mexico and all the Central and South American states considered together.

The exhibition is projected by some of the most prominent Italians, and will be conducted under the auspices of the Italian government and the United States Consul-General. It will have forty-one branches in the different Italian cities, and its getters-up and managers promise to do all in their power to encourage trade between the two great Nations. The permanent exhibition is to be free to all, and only such goods are invited as are apt to find a sale or to meet a want in Italy or the Mediteranean ports. The charge to exhibitors is only $15 for twelve months, an exceedingly reasonable amount, especially when it is considered that the exhibition company takes full charge of the exhibit on its arrival in Rome.

THE PURCHASING POWER OF A DOLLAR.

The Boston Commercial Bulletin compares the purchasing power of a dollar in 1885 with that of the same unit of value in 1875, '55, '45 and '25. In doing so it takes the average wholesale prices of fourteen leading commodities, viz: wheat, corn, coal, iron, salt, pork, beef, rice, sugar, butter, cheese, cotton, wool and leather. First, the price of these as per fixed quantity are given, that is to say, wheat is quoted by the bushel, corn and salt by the sack, coal and iron by the ton, pork and beef by the barrel, and the rest by the pound. The result of the comparisons is to show that in the half of a century between 1825 and 1885, wheat advanced 11 cents, beef $1.50, rice 1¼ cents and butter 3 cents. Pork suffered the least, losing only 30 cents per barrel, while coal declined from $9.50 to $3.85, iron from $55 to $18, and salt from $2.60 to 85 cents. But the more interesting table is that in which the Bulletin presents for comparison such quantities of each commodity as, at market quotations in 1825, would be worth $55 or about that amount. It is given below, and will be well worthy of careful examination:

	1825.	1845.	1855.	1875.	1885.
Iron, per ton....	$55 00	$ 4 00	$ 31 75	$35 00	$18 00
Wheat, 60 bushels	54 60	67 20	142 80	68 40	61 20
Corn, 95 bushels.	55 10	61 75	103 80	59 85	50 35
Coal. 6 tons.......	57 00	21 50	39 00	29 82	23 10
Salt, 20½ sacks...	54 94	28 70	21 73	43 75	17 42
Pork, 4 barrels...	53 20	45 60	71 00	81 48	52 00
Beef, 6 barrels...	54 00	45 00	67 50	51 00	63 00
Rice, 1,833 lbs....	55 00	67 21	76 37	137 47	96 25
Sugar, raw 650 lbs	55 50	32 50	39 00	32 50	22 50
Cutter, 366 lbs....	54 90	27 45	82 35	82 35	65 88
Cheese, 740 lbs...	55 00	51 80	66 60	92 55	44 40
Cotton, 275 lbs...	55 00	17 87	24 75	40 25	30 25
Wool, 275 lbs.....	55 40	43 20	48 00	68 80	46 40
Leather, 230 lbs..	55 20	39 00	52 80	57 60	55 20
Average.....	$54 90	$42 93	$61 96	$63 13	$46 85

INDESTRUCTIBILITY OF GOLD.

Sir Henry Vivian: Gold may be said to be everlasting, indestructible. The pure acids have no effect upon it. Air and water are alike prohibited from working in destruction; while to baser metals they are decay, to gold they are inoculous. Bury it through long ages, and when the rude tool of the excavator again brings it to light, while everything around it, and originally associated with it, has returned to dust from which it sprang; while the delicate form which it adorned has become a power so impalpable as to be inappreciable; while the strong bone of the mighty warrior crumbles as you gaze upon it; while his trusty sword lies a mass of shale rust, the delicate tracery in gold which adorned it or the finely wrought tiara which encircled the lofty brow of the fair damsel, is there in its pristine beauty, perfect as when it left the workman's hands and became the joy of the fleeting moments. Yes, days, years, centuries have rolled by; mighty empires have risen and fallen; dynasties that dreamed their power was to be everlasting have passed away; armies have marched, conquered, and become nerveless with decrepit old age; cities teeming with population and commerce have become the dwelling place of the owl and the bat; the very pyramids themselves, raised in the pride of power, and destined to be forever, have crumbled, and are crumbling, and yet that thin filament of gold has stood unchanged through all these mighty changes. It has withstood triumphantly the destroying hand of time; it is to-day what it was three thousand years ago. Surely it is a noble metal worthy of all admiration.

BARTHOLDI'S "LIBERTY."

In connection with the scheme for providing a pedestal for the colossal statue of "Liberty" presented to the American nation by France, the New York (N. J.) Journal has on exhibition at its office an exact reproduction of Bartholdi's great work, in bronze, standing upon a handsome mahogany case containing an electric attachment. When a quarter of a dollar is dropped into the aperture at the base of the statue, a cam inside revolves, depositing the coin in a locked drawer below. At the same moment the cam presses a spring, which completes an electric circuit between a set of Bunsen cells beneath, and a minute Eddison incandescent lamp which Miss Liberty holds aloft in lieu of a torch. The torch flashes its tiny light for a moment at every coin that enters the drawer.

A NEW FIBRE.

Some time since the Two Republics noted the discovery in Nuevo Leon of a new fibre resembling flax. Since then a Laredo capitalist who discovered it has been forming a company to develop the fibre on a large scale. Speaking of this discovery to the representatives of this journal, he says the plant is found in abundance in the arid lands of Nuevo Leon, and seems to flourish on a rocky, desert soil, which is unserviceable for other products. Reproduced in good soil and cultivated, it will grow very rapidly, reaching a height from two to five feet. The shoots are of different thicknesses, all having abundant fibre, which is beautiful in appearance, solid, strong, and easily drawn out even by hand from the shoot. It is a straw color, but easily bleached. The fibre is finer and stronger than flax.—[Two Republics, City of Mexico.

A curious thing about the excavation of the ruins of the Atrium Vestæ, at Rome, was the discovery of a number of Anglo-Saxon coins, dating from 901 to 946. How did these foreign pieces happen to get dropped in the heart of the Eternal City? This puzzle is rather more difficult than that involved in the finding of pieces of Roman money in every part of Europe. But the number of ancient Roman coins dug up here and there is astonishing. A few years ago borings on the brink of some rather well-known hot springs in the east of France brought to light no fewer than 4,700 Roman coins. Four of these were gold coins of Nero, Hadrian, Faustina, Jr., and Honorius; 265 were silver coins, principally of Imperial and consular types, associated with a few Gaulish coins. Of bronze there were as many as 4,468—large, middle and small brass—ranging over a considerable period. With the coins were associated other objects, such as statuettes, pins and rings, in bronze, gold, lead and iron. What does this mean? Simply that well-to-do Romans were quite as much in the habit of resorting to thermal springs for pleasure and profit as millionaires of our own day,

Well may we doubt the success of the alchemists of old in their search for the "elixir of life," but if the views published in England by Mr. W. O. Dawson are correct, modern science at least appears to be able to retard the progress of old age. Mr. Dawson tells us that the changes which produce old age are due to an excessive action of the oxygen we breathe and to accumulation of lime salts in the body. He does not state whether the oxygen effects may be in any degree counteracted, but he believes that life may be prolonged by reducing the calcarious deposits to a minimum. This he would accomplish by a plan suggested by Mr. DeLacy Evans. The plan is to avoid food containing a large proportion of earth salts—such as the meats from old animals—and to use daily, after middle life, several glasses of distilled water containing a few drops of phosphoric acid. Distilled water is necessary on account of its great solvent power.

Col. Snowden, former superintendent of the Philadelphia Mint, has perfected an invention which, it is said, will render it impossible to counterfeit United States coinage. This invention consists of a twice bisected steel collar, which when attached to the dies will form raised letters upon the peripheries of the coins. The new coin cannot be imitated by counterfeiters, because it cannot be made in a mold or by any process except the steel collar, hand engraving or a screw press. Milled coins can be lifted out of a mold without injury, because the lines upon their edges are straight up and down. The new ones have letters and stars on their edges, and cannot be taken out except by injuring them and mutilating the molds.

Paper it is said is taking the place of cedar in the making of lead pencils. A novel use for paper has been found in the manufacture of gas-pipes In addition to being absolutely tight and smooth, and much cheaper than iron, these pipes are of great strength, for when the sides are scarcely three-fifths of an inch thick, they will stand a pressure of more than 15 atmospheres. If buried under ground they will not be broken by settlement, nor when violently shaken or jarred. The material being a bad conductor of heat, the pipes do not readily freeze.

The Los Angeles Herald describes a specimen of the vampire family recently caught there: "This huge specimen measured twenty inches from tip to tip of his wings, and was pretty well armed with teeth and claws. His head was as large as the heads of four or five bat heads combined, and well hooded with two ears fully as large as a half dollar. His majesty was as vicious and war-like as a scorpion or tarantula when confined, and his bite would probably be as dangerous."

Prof. Joseph Stanley Brown, one of the geologists of the National Survey, has resigned and his resignation accepted by Secretary Lamar. Science loses in him a close observer and careful recorder of mineralogical and geological dates. He will, however, we trust, be restored to active labor as his resignation, which is entirely voluntary, is for the purpose of pursuing special scientific study at New Haven.

A Sweedish engineer has succeeded in producing a new explosive, which he calls romite. It is claimed that no elaborate machinery is required in the manufacture of this explosvie, that it will not freeze, and cannot be exploded except by ignition. Experiments have been made with the new explosive for blasting, and it has also been tried in shells, the results, it is said in both cases being entirely satisfactory.

There is a wonderful fish in Goose Lake, Oregon. It is called by some the greenback fish, for it is certainly an inflationist. It has the power to fill itself up with air until it becomes very much like a round ball. Of evenings, about sundown, they may be seen playing on the surface of the water. They will swell up by taking in the air, and the wind will blow them over the lake They reflect all the colors of the rainbow, and when sporting over the lake are a grand sight.

Eyesight among civilized people is by no means as strong as among savages. A gentleman in Zululand, by the assistance of a powerful glass, made out two distinct objects on the horizon, which he guessed to be a mounted man with a walking companion. The Zulus with him was able at once to inform him who the gentleman was, and that he was accompanied by his wife on foot.

In 1879 only 103 fossil insects from the carboniferous rocks of the whole world were known, but during the last five years a great number have been discovered, including 1,400 from Commentry, France, a few from Saarbruck, Kleinopitz, Lugau and other Continental European mines, and a very considerable number from the mines in this country.

Late Belgian experiments have had the object of preserving wood by exhausting the air from the pores and causing liquid gutta-percha to take its place. The gutta-percha is liquefied by being heated with paraffine, and it hardens on cooling after being introduced into the wood.

According to late advices from Japan, every man of any means, and even the local officials, in the Toyama prefecture, is studying the English language. It appears to be a general belief that those who do not know the English tongue are behind the times.

A Japanese has discovered a process of making paper from seaweeds. It is thick in texture. and owing to its transparency can be substituted for glass in windows, and when colored makes an excellent imitation of stained glass.

A four-footed bird is found on the island of Marago, at the mouth of the Amazon. In time one pair of legs are changed into wings by as singular a process as that which make the tadpole a frog.

A cable message received at Harvard College Observatory, from Dr. A. Krueger, at Kiel, announces the observation, at Nice, of Tuttle's Comet, giving the following position:

August 9.6124 Gr. M. T. R. A. 7h. 23m. 43.1s. Decl. + 28 deg., 1 min. 24 sec.

The last word in the message, probably indicating motion (terrotin), is unintelligible.

MISCELLANY.

ROMANCES OF MINING.

So many misconceived notions are entertained about frontier mining towns and the bloodthirsty disposition of the inhabitants, writes a correspondent of the Philadelphia Press, that I have recalled from memory scenes that, while they may not counteract this belief, will, to a certain extent, show that romance and fate have a great deal to do with the promulgation of this notion. In 1867 one of the most productive mines discovered near Leadville, Col., was found by a Mr. Long, who, hungry, emaciated, and with a large old English penny in his pocket, "for luck," as he called. it, went out shooting for a breakfast. A deer was his first shot; the animal died hard, struggled, kicked up the earth, and eventually subsided in a particular rocky spot. Long hastened to its side, and, instead of a dead deer, he discovered evidences of gold dust. Long informed his partner, a Mr. Derry, and they possessed themselves of the spot and became rich. That was before Leadville became what it is to-day. Hardly six months had passed, when news, rehashed, magnified and made sensational by eastern journalists, went travelling over the country that two gamblers, notorious characters, had waylaid a party of travelers, composed of a lady and three men, assaulted them, and, killing them, found in their pockets evidence of a rich gold mine and pre-empted it. Wilbur F. Story, then in the height of his power as a journalist, had seen the story. He knew Long, examined into the truth of the tale and gave a true version of it.

The Eberhardt Silver mine was discovered in 1868, near Elko, Nevada, by a boy who was working for a gang of men cutting ties for the Central Pacific railroad, then in course of construction. Elated with his success he disclosed his secret to a man who was foreman of the gang. The foreman pre-empted it and sold it, as guardian of the boy, to an English company of capitalists, for a large sum of money. Some friends of the youth, who were Germans, became interested in the matter and found he had been defrauded out of his rightful dues, and they instituted suit against the company to test their claim. The company compromised with them for some $500,000, and another sensational story came east, was published first in Boston, of the kidnapping of a boy by bloodthirsty cowboys, who asked a ransom for him, as he was the owner of a wealthy silver mine, and what gave additional color to the matter in Massachusetts at the time was the death of an immensely wealthy gentleman, who left his entire property, amounting to millions, to his son, a minor who was missing for a few days. I believe it was through the efforts of a Mr. Bacon, a Boston journalist, that the matter was investigated and the truth proclaimed.

Some six years ago Mr. Ernest Ingersoll published in Scribner's Monthly a very long article on Leadville, and I remember he mentioned the finding of the Camp Bird mine there by the Gallagher brothers, two illiterate sons of the Emerald Isle; but as he never told how they discovered it, and the sensation it produced east subsequently, I will relate it. These Gallagher brothers, Dan and Michael, were exceptionally Irish in everything, very poor, but honest, shrewd, and to a certain extent superstitious. One day, together, they started out with a hope of getting employment, and in crossing a piece of country contiguous to the silver mine, Dan stopped to tie his brogans or army shoes.

"Oh, Mickey, here's luck!" he exclaimed, picking up a small sized silver quartz.

They both examined it and discovered it was genuine rocky quartz silver, and they possessed themselves of it. Not long after, a paper published not fifty miles from Chicago, gave a sensational account of two Irishmen, with pistols and etceteras, "jumping" a silver mine, the rightful property of an old Scotchman, the whole thing originating in the fertile brain of the writer. Dr. Wood, then on the New York Sun, had a suspicion that all was magnified, and wrote a long article to a western paper, arriving at the truth.

There has been more romance connected with early Leadville than any other place on the frontier. One of the most morgue-like stories that was ever published, was revamped from a minimum of truth into a maximum of romance. It was related to a claim called the Dead Man's Claim, discovered near Leadville. A man came from the eastern part of New York hoping to establish himself as a physician. He was talented, educated, but very delicate, entirely unfitted to stand the hardships of a frontier life, especially a winter life, when, penniless and hungry, he found himself stranded and with no shelter but that afforded by stray saloons and gambling places, for Leadville was already overrun with physicians, lawyers, and men of brain. He had a few friends among the many happy-go-lucky fellows he met, and they helped him as best they could. Suddenly he was taken sick with pneumonia and died. The poor fellows who stood by him in his sick-room were determined that he should have a decent burial, so they clubbed together and raised a purse of $50. An old miner, "dead broke," and a sort of handy man around the saloons, named Parish, was given $30 to dig the grave, and $20 for a coffin.

It was in the dead of winter, the snow five feet on the level, so the body was taken out and buried in the snow, while Parish started at his work. The two men who had collected the fund for his burial got interested in a long game of poker, and after sitting nearly forty-eight hours concluded they would hunt up Parish and find out how he was progressing. So one morning they adjourned to the spot, and there was Parish digging away for dear life. He had struck a paying mine, and forgetting all about the body, was unearthing treasures. The two friends claimed their share. Parish would not yield. Eventually the affair was compromised and sold out to advantage to a company. Later the poor doctor was buried, and the matter became a ten days' wonder and died out as far as Leadville was concerned, when one morning Parish's attention was called to a long article in a newspaper of how he and a gang of murderers had in cold blood murdered a wealthy gentleman and "jumped" his claim. The matter was the occasion of a general laugh around Leadville, and poor Parish for sometime after earned the sobriquet of the "death dealers' jumper."

GREAT GAMES OF CHESS.

In the history of the Saracens, it is said that when Al Amin, the caliph of Bagdad, was besieged in his city by his hereditary enemy, Al Muram, he was engaged in a game of chess with his freedman and attendant, Kuthan. The enemy was advancing in tremendous force upon the city gates. Terror-stricken, the courtiers rushed in to warn the caliph of his danger, but he would pay no attention to them. "Let me alone," he said; "I see a checkmate against Kuthan." This ruler was so devoted to chess that he had his kingdom searched for all the good players, and had them brought to his palace, where, whatever their rank, he made them friends, and heaped gifts upon them. Among these was the slave Kuthan, who became the caliph's favorite antagonist in the game. The case of Al Amin furnishes a by no means singular instance of the absorption of interest possible in this fascinating game. King John was at chess when the deputation at Rouen came to tell him that Philip Augustus had besieged the city, but he refused to give them an audience until the game was done. Charles I. was engaged in playing chess when the news was brought to him that the Scots were going to sell him into the hands of the English, and manifested no interest whatever in the intelligence until his game was finished. So, too, John Frederic, Elector of Saxony, when imprisoned in 1547, was beguiling the time by playing chess with a fellow-captive at the moment when a messenger came to tell him that the Emperor had sentenced him to be beheaded before Whittenberg. He betrayed no agitation at the news, but proceeded with the game, and expressed the heartiest satisfaction at the close over the fact that he had beaten his opponent. The Hindoos say that chess was the invention of an astronomer who flourished several thousand years ago, and who was possessed of supernatural knowledge and acuteness. The Greeks claim that it was the invention of Palamedes to beguile the tedium of the siege of Troy. The Arab legend is that it was devised for the instruction of a young despot by his tutor, a learned Brahmin, to teach the youth how a king was dependent upon his subjects for his safety. Oriental chess is of two kinds, Chinese and Indian chess. The Chinese game is played generally in eastern Asia; but in India and the adjacent islands, and, with some slight modifications, all over the civilized world, Indian chess is played. The bishop is the elephant in India, the castle the boat, and the queen the minister; otherwise the pieces are identical with those known to us. There is a chess school in India with its salaried professors, and success in the game is held in very high regard. Monesh Ghutuck, it was said, could play a fabulous number of games when lying on the ground with his eyes closed. The complications of the game called the Indian problem are known all over the Occident as among the most difficult ever devised. The Chinese chess-board has sixty-four squares and a broad strip called the River Ho across the middle. The castle is known to them as the war-chariot, the bishop as the elephant, the knight as the horse, and for the king and queen they have a general and two officers. They have but five soldiers or pawns, and two cannon, the latter being able to move over the heads of the officers. The general, cannon and chariot can not pass the river. The Persians call chess Timour's game, because of the favor in which it was held by Timerlane, the great Tartar ruler who lived in the fifteenth century. This king found the game so easy that he introduced additional men and moves to complicate it. This was the origin of what is known as great chess in Persia, in contradistinction from little chess, the common game. This is played on a board with 110 squares and fifty-six men. A Persian emperor is said to have called one of his sons Sehahrohk because at the moment he received the intelligence of the infant's birth he was playing chess, and had just given check with his rohk (castle) to his adversary's king (sehah.) Kings and potentates have usually delighted in chess. Charlemange delighted in the game. So did King Canute or (Knut) the Dane. Ivan the Terrible, of Russia, died in 1584 of an apoplectic fit, caused by rage at a checkmate received from a subject. Queen Elizabeth was very fond of chess. So was Napoleon I. He opened his games badly, his biographer assures us, but when warmed up to the game he made some very brilliant moves. At St. Helena he played daily, going over on the board the battles that he had fought, and more than once declared that he ought to have won at Waterloo. Louis XII. of France was so fond of chess that he played it in his carriage.

Casimir II., King of Poland, in the twelfth century, prohibited the playing of chess in his dominions. A similar law was enacted by the Turkish Caliph Hakim, in the year 1025, punishing with the bastinado all who disregarded it. Louis IX. of France (St. Louis) forbade the playing of chess at court under the penalty of a fine, and Edward IV. of England had a law enacted strictly prohibiting chess throughout the kingdom. James I. detested the game. The Knights Templar abhorred chess, and so did St. Bernard, and very many other church dignitaries, but this was probably for the same reason that Montaigne gave, that he hated chess because it fascinated him so.

A civil war in France owed its origin to a game of chess. Regnault, a nephew of Charlemange, and Berthelot, a knight of the court, had a quarrel while at the game. Berthelot struck his opponent in his anger, whereupon Regnault lifted the chess-board, which, as the story goes, was of solid gold, and struck him dead. A factional war of several years followed, which involved half the kingdom.—[N. Y. Mail and Express.

A WHALE ENTANGLED IN A TELEGRAPH CABLE.

In August of last year some articles under the above heading appeared in the daily papers, referring to a very interesting account of the breaking of a submarine telegraph cable by a whale. The account in question was somewhat meagre in detail, and not altogether correct; and my excuse for resuscitating the matter is that I have lately received a history of the circumstances from an eye-witness, and perhaps the story is of sufficient interest to merit a place in your columns. It struck me at the time that the subject was far too summarily abandoned, and that those who had full information at their command should have given more details. For instance, one would like to know the depth of water at the place where the whale was discovered attached to the cable, and whether any fault existed beyond the damage actually done to the cable, by the whale in its efforts to escape, or if there was any break, due perhaps to some submarine landslip. And I may here mention that the cables laid along the coasts of Peru and Chili (the one now under discussion forming part of this system) have more than once been broken by these submarine landslips, which, I believe, have generally been found to correspond with some severe earthquake felt on the coast.

It was stated in the account referred to that the interruption of telegraphic communication was owing to damage caused by the whale. Now, if this were the case, one must believe that the animal, while groping about the bottom, had come across the cable, and had there gathered up sufficient slack so as to wrap several turns of the cable round it. It is difficult to understand how this feat could have been accomplished. Nor is this all; for, as more than a week had elapsed between the date of the interruption and the moment when the whale was discovered attached to the cable, we must also believe that during this time the animal had submitted to captivity, retaining for so long a period life and strength. In order to live, a whale must come up to blow; and if the one in question had done this, entangled as we are told, in the cable, it would have been obliged on each occasion to lift an enormous weight from the bottom, besides sustaining repeated injuries due to the strain of the turns of cable round it.

From my correspondent's letter, it appears that the cable was grappled for and hooked (how far from the point of interruption is not stated), and some considerable quantity picked up, when an abnormally heavy strain was noticed. The picking up was continued very slowly and cautiously, as it was supposed that the cable was to some extent buried. It soon, however, became evident, that the cause of the great strain was a huge mass, apparently attached to and coming up with the cable, and the astonishment of all on board may be guessed when it was seen that a whale some seventy-five to eighty feet long was entangled in several turns of the cable. On reaching the surface the animal commenced a series of plunges, which quickly resulted in the breaking of the cable close to the bows; and at the same moment the turns round the whale cut deeply into his body. After a few weak struggles and some spouting of blood and water, the whale lay motionless, the turns of the cable still remaining round it.

The ship, released from the cable, naturally drifted to leeward, and the stench emanating from the carcass is described as having been something awful. The cable appears to have been again grappled for, and picked up some little distance off, and the short piece attached to the whale at one end was buoyed at its other extremity. The repairing operations were continued, the whale meantime being sighted several times, and myriads of birds had collected around it.

The repairs being completed, the ship could not recover the short piece of cable attached to the whale, owing to the bad weather having suddenly set in, and it was necessary to lie-to during the afternoon and night. The next morning it was found that the whale had disappeared, and on recovering the piece of cable only a few pieces of blubber were discovered still remaining on the turns which had encircled the whale. The cable in the immediate neighborhood of the part which had imprisoned the animal was found to be much crushed, in many places the sheathing wires being forced open, the core destroyed, and the copper conductor broken, as if the whale in its endeavor to escape had tried to bite through the iron wires.

It seems a difficult matter to attempt a solution of how the whale became entangled. In the case of the Persian gulf cable to which a whale was found attached, I have heard it suggested that the animal, finding a portion of the cable suspended across some depression in the bottom, had tried to rub off, against the cable, lice which so much trouble these creatures, and in doing so had wrapped several turns around its body. I think, from the circumstances, that in the case now under notice such could not be the motive for the whale's interference with the cable. Perhaps some of your readers may be able to throw light on the subject.—[Cor. London Field.

A STORY OF TWO RATS.

A correspondent of "Land and Water" tells a story of two white rats which he had adopted as pets. The male was a quiet, commonplace sort of rat, acquaintance with whom afforded few incidents of particular interest. The female was a great coquette, and a regular domestic tyrant, exercising absolute control of her spouse and household. Always pleased with the gift of some dainty, she was, "rapturously delighted" if allowed to think she had stolen it. If the master would have a piece of sugar on the table, she would creep up and take it, retreating behind a book to devour it, as she hoped, unobserved. She was a relentless enemy to mice; and, when one of these animals was put into her cage, "she flew at it and slew it with a single bite, leaving it instantly, as a well-trained terrier does the rat it has killed." The first occasion of Anna Maria having little ones was quite an event. "When I went to the box, as usual, to give my little rodents a scrap of whatever I might have had, I found Augustus (the male) sitting out in the cold and looking terribly sheepish. On opening the sleeping compartment, there was Anna Maria, with something like a smile upon her shrewish little countenance, keeping watch and ward over nine ridiculously naked little offspring. On these occasions Augustus was completely effaced, He shirked the slightest responsibility; and I always had to make him up a separate bed, for sleep with his children he would not. If by chance he was forced to walk among them, he did so with an anxiety that would have done credit to an elephant stepping between eggs. As they grew up, assumed hair, and began to run about, he would allow them to take liberties with him, and even rob him of tidbits." The master thought the hay the naked little fellows were lying upon too rough for their tender skins, and put wadding in its place. "But, with a sneer of contempt for the stupidity of men in such matters, Anna Maria promptly cast out the wadding and bumped her progeny upon the hay again." In washing them, "she would roll them over and over with her paws, and lick them till the sparks flew; and they would utter plaintive little squeaks." But they throve splendidly. "Every night this graceful couple gamboled about my table while I read or wrote. It was a delight to me to watch them at their toilet or eating the food which they held in their delicate little paws When tired of play, they would clamber up to my shoulder and slumber, huddled together like two love-birds." Anna Maria at last died of a cold, and her place was supplied by a new female, whose chief peculiarity was that as soon as she had a family she would bite off her babies' heads."—[From Popular Miscellany, in Popular Science Monthly for September.

SONG OF THE ICHTHYOSAURUS.

[This curious specimen of German scientific humor refers to the close of the Jurassic (or Liassac) period and beginning of the Cretaceous, and describes the sad forebodings of a venerable Saurian, who sees in the degeneracy of the times a sign of the coming cataclysm.

The translator says, "Among the extraordinary liberties which we have been obliged to take with the letter of the original, in order to preserve as far as possible its spirit and its flowing movement, the most violent is the substitution in the last stanza but one, of an entirely new, (and poor) joke for the very neat but untranslatable jeu of the German. The last two lines of the stanza are:

'Sie kamen zu tief in die Kreide;
Da war es naturlich vorbei.'

The literal meaning is, 'They got too deep in the chalk, and it was, of course all up with them.' The allusion is to a score chalked up by a landlord against some bibulous but impecunious customers; and the notion that the saurians ran up so large an account for drinks that the chalk required to mark their indebtedness smothered the whole race, and brought on the Cretaceous or chalk period, is so absurdly funny that it is a pity to sacrifice it."]

There's a rustling in the rushes,
There's a flashing in the sea,
There's a tearful Ichthyosaurus
Swims hither mournfully!

He weeps o'er the modern corruption,
Compared with the good old times,
And don't know what is the matter
With the Upper Jura limes!

The hoary old Plesiosaurus
Does naught but quaff and roar;
And the Pterodactylus lately
Flew drunk to his own front door!

The Iguanodon of the period
Grows worse with every stratum;
He kisses the Ichthyosaurusses
Whenever he can get at 'em!

I feel a catastrophe coming;
This epoch will soon be done,
And what will become of the Jura
If such goings-on go on?

The groaning Ichthyosaurus
Turns suddenly chalky pale;
He sighs from his streaming nostrils,
He writhes with his dying tail!

In that self-same hour and minute
Died the whole saurian stem,—
The fossil oil in their liquor
Soon put an end to them!

And the poet found their story
Which here he doth indite,
In the form of a petrified album-leaf
Upon a coprolite!

—[Tidings from Nature.

THE PHILOSOPHY OF LONG LIFE.

In a very readable article on the philosophy of longevity, the London Standard says: "To make yourself miserable at 40 in the wretched ambition to add a few worthless years to your score after you have turned 70 or 80, is surely a poor-spirited sort of game. To spend one's life feeling one's pulse, looking at one's tongue, and asking one's self if one is treating one's constitution quite fairly, is not life at all. It is to live in a hospital, or at any rate, an infirmary. Still, there are some persons who are congenitally cautious, congenitally cold, congenitally calm. It is their nature to take things quietly, never to be in a hurry, never to excite themselves. They are content to sit in an easy chair for so many hours, read an agreeable book for so many hours, drive in a carriage when the weather is favorable for so many hours, and to regulate their existence by clockwork. They may live to 100, they may live to 1,000, but in truth they have not lived at all. The man who really gets the best that can be got out of life is the man who, with a fairly good constitution to begin with, is ready to squander it at any moment and on every occasion in a sufficient cause. He keeps no account of profit and loss with his vital energy; he sees work to do, and he does it; he sees pleasure to be enjoyed, and he enjoys it. He is alive all his life save when he sleeps; and he wakes from each fresh slumber looking cheerfully and encouragingly in the face, and ready and even eager to be a combatant when there is a good honest fight, and a runner when there is a good honorable race afoot. He may not live to be 100, but he may well live to be 70, 75, or even 80. He may have a career, if not so conspicuous, yet as active, as varied, and as restless as that, say, of Mr. Gladstone, and yet not be really old when time registers him among the aged. 'Better fifty years of Europe than a cycle of Cathay'; and better twenty years of uncalculated activity than the slow pulse and measured step of the circumspect snail that creeps slowly on to 100. We are not denouncing centenarians. They are like angels' visits, few and far between, and yet they are too rare not to be welcomed. Moreover, we doubt not that they deserve their length of years. But it would be a misfortune if it was ever thought an object of life to live very long. The object of life is to live, live generously, live bravely: As Shakespeare says, 'Ripeness is all.' "

OUTWITTING THE GHOST.

If primitive man knew how to bully, he also knew how to outwit the ghost. For example, a ghost can only find his way back to the house by the way by which he left it. This little weakness did not escape the vigilance of our ancestors, and they took their measures accordingly. The coffin was carried out of the house, not by the door, but by a hole made for the purpose in the wall, and this hole was carefully stopped up as soon as the body had passed through it; so that, when the ghost strolled quietly back from the grave, he found to his surprise that there was no thoroughfare. The credit of this ingenious device is shared equally by Greenlanders, Hottentots, Bechuanas, Samoieds, Ojibways, Algonquins, Laosians, Hindoos, Thibetans, Siamese, Chinese and Feejeeans. These special openings, or "doors of the dead," are still to be seen in a village near Amsterdam, and they were common in some towns of central Italy, as

Perugia and Assisi. A trace of the same custom survives in Thuringen, where it was thought that the ghost of a man who has been hanged will return to the house if the body be not taken out by a window instead of the door.

The Siamese, not content with carrying the dead man out by a special opening, endeavor to make assurance doubly sure by hurrying him three times round the house at full speed—a proceeding well calculated to bewilder the poor soul in the coffin.

The Araucanians adopt the plan of strewing ashes behind the coffin as it is being borne to the grave, in order that the ghost may not be able to find his way back.

The very general practice of closing the eyes of the dead appears to have originated with a similar object; it was a mode of blindfolding the dead, that he might not see the way by which he was carried to his last home.—[From "The Primitive Ghost and his Relations," by James G. Frazer, in Popular Science Monthly for September.

FRENCH WORKING PEOPLE.

The condition of the working people in France has steadily improved during the past seven years. Wages have increased from 10 to 40 cents, thus enabling laborers to live more comfortably. The effect of this is felt in more cheerful home life. Children enjoy a better education, and are not compelled to go to work until they reach the age of 12 or 13 years. The usual number of working hours is ten. The national habit of economy enables laborers to lay up a little money for old age.

The food of a French workingman consists of bread, wine, vegetables, and vegetable soup, with meat only at rare intervals. Breakfast is frequently a cup of black coffee and a piece of bread; dinner, soup made from salt pork and horseflesh or cheap beef and vegetables, and a portion of the meat with bread, and for supper, bread and meat left from dinner, with potatoes.

CURRENT LITERATURE.

NATURAL HISTORY.

THE STANDARD NATURAL HISTORY. Edited by John Sterling Kingsley Vol. I., Lower Invertebrates. Vol. II., Crustacea and Insects. Boston, S. E. Cassino and Company, 1885. Kansas City, C. E. Hudson & Co.

It is with sincere pleasure that the REVIEW calls attention to the two volumes described above. To those acquainted with the voluminous nature of the literature on the subject of Natural History, it might seem superogatory to add six additional volumes, imperial octavo, to it. But, while there is no lack of books and periodicals devoted to the investigation and classification of facts in zoological science, it is only just to say that there are few of these which treat of animated nature in a way that combines technical precision of statement and thoroughness, in all branches, with interest for the non-scientific reader. Indeed the most of the books on the subject, which pretend to a comprehensive character, are school text books and, like most books of this character, of very little interest to those who wish something more than a dry and cold catalogue of facts. The lack of such a book has been frequently commented on by writers, both in science and general literature, and the Natural History before us is the outcome of an attempt to meet the demand. That the attempt has been successful may be gathered from the praises bestowed upon it by eminent students. Professor Cope says: "In my opinion the Standard Natural History is the best popular work on zoology which has yet appeared. It has an exceptional advantage as the product of a corps of the best specialists that America affords, and is under the supervision of entirely competent editors." Professor Coues asserts "It will be by far the best thing extant," and Dr. Leidy, "I regard it in all respects the best and most reliable popular Natural History that has ever been published in our country."

The fact, alluded to by Professor Cope, that each department of zoological science will receive the attention of a specialist is worthy of note here. This branch of knowledge, like most others, has in our age assumed most formidable proportions. In the eighteenth century it was quite possible for the student to become versed in all that was known of the animal kingdom; but in our day the zoologist cannot hope for eminence if he diffuses his labors over the vast mass of facts that connect in one science the humblest protozoa with the highest man. Thus zoology is divided into several fields and by choosing some one of these as a specialty, the student can achieve results of great and permanent value to science. Taking advantage of this fact, the publishers of the work in question have secured some of the best specialists in this country and, putting together their work, present us with a result wonderfully complete, harmonious and interesting.

The plan of the work is philosophical. Beginning with the lowest forms of animal life, the method of treatment follows the gradual development of complexity of structure and function and increase of intellectual powers until it ends with man. In accordance with this plan the work is arranged in the following order: Lower Invertebrates; Anthropods; Lower Vertebrates; Birds; Mammals; The Races of Man. Each group, into which these subjects are divided, is made the topic of an article by some prominent naturalist who has paid especial attention to its investigation; and by this means the latest discoveries and inductions, as well as the old established opinions, are ably and thoroughly presented.

The contents of the volumes received may be generalized as follows:

Vol. I. Lower Invertebrates. This volume begins with a general introduction to the Animal Kingdom, defining the terms used, and showing the field of Zoology as a whole. Following this is taken up, in systematic order, those simple, microscopic forms known as Protozoa, and then the Sponges, Jelly-fishes, Sea Anemones, Corals, Worms, Mollusks, Star Fishes, and Sea Urchins. The various articles are prepared by Prof. W. K. Brooks, of the Johns Hopkins University; Prof. S. F. Clarke, of Williams College; Dr. J. W. Fewkes, of the Museum of Comparative Zoology; Mr. A. F. Gray, of Danvers, Mass.; Prof. C. E. Hamlin, of Harvard College; Prof. Alpheus Hyatt, Boston Society of Natural History; Prof. Romyn Hitchcock, of the National Museum; Prof. D. S. Kellicott, of Buffalo, N. Y.; Dr. C. S. Minot, of Harvard Medical College; Prof. A. S. Packard, Jr., of Brown University.

Vol. II. Crustacea and Insects. The whole group of Animals with jointed limbs, of which half a million species exist, occupy this volume. Here will be treated the Lobsters and Crabs, Spiders, Thousand-legged Worms, Dragon-Flies, Grasshoppers, Bugs, Beetles, Moths and Butterflies, Flies, Ants, Wasps, and Bees. Among those contributing to this volume we may mention Prof. E. A. Birge, of the University of Wisconsin; Prof. J. H. Comstock, of Cornell University; Dr. Geo. Dimmock, of Cambridge; Mr. Henry Edwards, of New York; Prof. C. H. Fernald, of the Maine College; Mr. J. H. Emerton, of the United States Fish Commission; Dr. Geo. H. Horn, of Philadelphia; Prof. J. S. Kingsley, of Boston; Prof. A. S. Packard, Jr., of Brown University; Prof. C. V. Riley, United States Entomologist; Dr. P. R. Uhler, of the Peabody Institute at Baltimore; Dr. S. W. Williston, of the Yale College, etc.

If the first two volumes indicate, with any degree of accuracy, the standard of excellence to be expected in future volumes they will leave nothing to be desired in either manner or matter. It is a credit to the American press to produce such sumptuous volumes and a greater credit to the American people that their culture and love for knowledge, makes such a venture remunerative.

Apropos of this subject it is well to remind those whose interest it is to direct the studies of youth that there is no branch of knowledge so fascinating to the young as natural history. The writer's first remembrances are tinged with impressions received from a ponderous illustrated volume entitled "Animated Nature"—a volume over which many happy and profitable hours were passed; and there is no doubt that many adults can recall a similar experience, The boy who acquires early a taste for such literature is not apt to go astray in his later reading. While poetry, fiction, Belle Lettres, have their uses in this direction, their content is drier, to the boy or girl, and, it must be confessed, they are conducive to but a barren culture. Upon leaving school, the youth is so seldom encouraged to pursue further the threads of science, to be found in the curriculum of his studies that he forgets what little he learned. If parents would make judicious selections when presenting books to their children, the disposition to get knowledge would soon acquire a desirable strength as well as a judicious character. A work like the above would be the most useful and acceptable Christmas or birthday present a parent could give a child.

The Kansas City firm interested in this work, Messrs. C. E. Hudson & Co., is a late addition to the business enterprises of this city. The members are young, energetic and enterprising and come well recommended from the east. They have entered into a general subscription business, carrying exclusively the best class of such books.

AMERICAN ART.

SELECTED ETCHINGS BY AMERICAN ARTISTS. H. F. Richter Publishing Company, Philadelphia. C. E. Hudson & Co., Kansas City.

This is a collection of superb etchings by noted American artists and far surpasses anything of the kind hitherto shown in this city. Only one hundred and fifty copies of this (the first) edition will be published, each of which will be numbered and signed by the artists. Buyers of expensive art works will be delighted with these etchings. Among the artists represented are the Morans (Peter and Thomas), Kruseman Van Elter, Henry Farrar, Samuel Coleman, etc.

It must be a pleasant reflection that Kansas City has a reputation for culture sufficient to bring such artistic productions into this market.

C. E. Hudson & Co. also handle some very fine medical works; especially on anatomical science.

MICROSCOPY.

The Microscope in Botany: A Guide for the Microscopical Investigation of Vegetable Substances. From the German of Dr. Julius Wilhelm Behrens. Translated and Edited by Rev. A. B. Harvey, A. M., assisted by R. H. Word, M. D., F. R. M. S. Illustrated with 13 plates and 153 cuts. Boston, S. E. Cassino & Company, 1885, pp 466. Price, $5.00.

The scope of this work is confined within very sensible limits. Generally it is thought necessary by writers on the microscope to prelude the practical portion of their works by treatises on optics, or on the special sciences to which it is applicable. But Dr. Behrens, a practical Microscopist himself, takes it for granted that his reader is acquainted with those branches of science which must be known before the microscope can be intelligently used; hence he expects the student to acquaint himself with the optical and histological branches of the subject before taking up his book. Such a reader will find this guide to the microscope, in the investigation of histological botany, not only useful but almost indispensible, especially so if he is an amateur or a beginner in the science.

The early chapters describe the microscopical apparatus and appliances necessary for satisfactory work with directions how to use them. Along with this part of the treatise is given full and intelligible directions for the preparation of specimens. Following are chapters on microchemistry, microscopical reagents and the microscopical investigation of vegetable substances. While all of these chapters contain, practically, a digest of our knowledge on the subjects treated, yet the last named is especially admirable and exhaustive; though, at the same time, its arrangement is so lucid and intelligent that it makes the student largely independent of the costly and, sometimes, unobtainable literature on this head. The book is not a mere compilation but embodies largely the results of original work. The American editors have performed their work well, though a disposition is manifested to over-crowd the text with praise of certain makers of apparatus and too frequent references to their address.

As to the style of presentation, too much cannot be said in its praise. It is a fair example of the lavish American method of printing books of this character.

Hegel's Æsthetics. A Critical Exposition. By John Steinfort Kedney, S. T. D., etc. Chicago, S. C. Griggs & Company 1885, pp. 302. Price, $1.25.

This volume belongs to the series of German philosophical classics just alluded to. The treatise of which is an epitome, or abstract, constitutes one branch of the most difficult of all philosophies. It is true that Hegel approached occasionally the simplicity of Greek dialectics; but it is only just to say that the spirit of his philosophy is almost beyond the reach of western thought; it is so far removed from the inductive method which now dominates every field of inquiry. It is equally true that the study of any other German philosophy, except that of Schelling, gives little aid to the student in comprehending or appreciating Hegel. For these reasons the work of Dr. Kedney will prove useful to those who share the renewed interest which Americans seem to nourish toward metaphysical and physological studies. Hegel's conceptions of an absolute spirit in art, religion and philosophy; of the adventitiousness of natural beauty in distinction to the legitimacy of artistic beauty; of the intimate relations between art and religion and philosophy; are so closely allied to certain forms of contemporary thought that we may look for a revival of Hegelianism on novel grounds at no distant period.

Prof. Kedney preserves the content of Hegel's system with singular fidelity (for so compressed a digest) and his own comments and elucidations are always judicious and intelligible.

Fichte's Science of Knowledge. A Critical Exposition. By Charles Carroll Everett, D. D., author of "The Science of Thought," etc. Chicago: S. C. Griggs & Company, 1884, pp. 287. Price, $1.25.

This book is one of a series of "German Philosophical Classics for English Readers and Students," now in process of publication by S. C. Griggs & Co.

Of all the philosophical systems which originated in, or took direction from, the study of Kant, none are worthy of a higher place in the history of modern thought than that of Fichte. It has exercised an important influence on the development of the naturalistic movement, incited by the Cartesian method and carried to s u cl.

wondrous heights in the science of our day. But this, like all German philosophies, has been sealed to most readers by the difficulty of its terminology and its rather verbose statement. Dr. Everett has performed a great service to American readers by his lucid, yet brief, presentation of Wissenschaftslehre of Fichte. Like the former volumes of this series, the present one shows the works of competent scholarship and criticism in its preparation.

A STRANGE MANIA.

The Dancing Mania. By J. F.C. Hecker, M. D. No. 72 of the "Humboldt Library of Science." J. Fitzgerald, Publisher, 393 Pearl St., New York. Price, 15 cents, post free.

The Dancing Mania of the Middle Ages is one of the most curious episodes in the history of mankind, whole villages, towns, and communities being seized with an irresistible impulse to dance and leap about, and to wander up and down the whole of Europe, communicating their frenzy to the people wherever they wandered. The symptoms of this strange disorder, and the mad antics of its victims are vividly portrayed by the author from contemporary annals.

Other Publications.

Local Institutions of Maryland. By Lewis Wilhelm, Ph.D., etc., Baltimore. N. Murray, Pub. Agt., Johns Hopkins University, 1885.

Bulletin de la Societe Royale de Geographie D'Anvers. 8th Annee sociale, 1884–5. Anvers. Imprimerie Veuve de Bocker, Rue Zirk, 35, 1885.

The Dancing Mania of the Middle Ages. By J. F. C. Hecker, M. D. Fr. by B. G. Babington, M. D. F. R. O., J. Fitzgerald, New York, 1885.

An Account of the Progress in Anthropology in the Year 1884. By Prof. Otis T. Mason. Washington: Government Printing Office. 1885.

Corrections of Thermometers. By Thomas Russell, Junior Professor, office of Chief Signal Officer: Washington City. Signal Office. 1885.

Bulletin of the Philosophical Society of Washington. Vol. VII. Washington, 1885.

Fourth Biennial Report of the Board of Directors of the Kansas State Historical Society. Presented to the society at its ninth annual meeting, held at Topeka, January 20, 1885. Topeka, T. D. Thacher, State Printer, 1885.

Report of the Professor of Agriculture, Kansas State Agricultural College. Experiments. 1884. Manhattan, Kansas: Printing Dept. State Agric. Coll., 1885.

Circulars of Information of the Bureau of Education. No. 2, 1885. Teachers' Institutes. Washington: Gov't. Printing Office, 1885.

PERIODICALS.

One never tires of praising the Magazine of American History, for it represents so much sterling merit and so little that appeals to the love of sensation, so prevalent in the world and so catered to by magazine makers. The September number is especially attractive. Aside from the illustrations, which comprise a steel portrait of General Grant, in military uniform and illustrations of old houses at Riverside Park, there is sufficient in the articles to interest the most blase magazine reader. Mrs. Lamb, the editor, furnishes an article on the "Historical Associations of General Grant's Resting Place," for which her past studies and achievements have fitted her. This is followed by "Washington's first Public Service" by J. T. Chapman, A. M., "Baltimore in 1861" by Maj. Gen. Jno. C. Robinson, "The Beginning of the Civil War in America." The Rebels taking the offensive," by Gen. Thos. Jordan, "Military Affairs in New York State in 1861;" by Gen. Meredith Reed. The other articles are 'Closing Days of LouisXIV"and"Tributes to Gen. 'Grant." Published at 30, Lafayette Place, New York.

The North American Review for September opens with a symposium on "Grant's Memorial: What shall it be?" wherein the subject is discussed from various standpoints, and by eminent representatives of culture and art. The same number of the review contains a consideration of the question "Shall our National Banking System be Abolished ?" by George F. Boutwell, F. J. Scott, S. Danna Horton, and Edward H. G. Clark. "Ouida" contributes an essay on "The Tendencies of English Fiction," and Elizabeth Stuart Phelps writes on"The Great Psychical Opportunity." Mr. French, late Sergeant at Arms, writes "Reminiscences of Famous Americans."

The Journal of the Franklin Institute for September, has for its initial paper, an article by John Sartain "On the Ancient Art of Painting in Encaustic," elegantly illustrated. The frontispiece, an illustration of this article, is a reproduction on steel of an exquisite specimen of ancient art in encaustic painting. It was discovered in the ruins of Hadrian's villa, and is supposed to represent Cleopatra receiving her death from the bite of an Asp. Another illustration is a reproduction of the "Muse of Cortona," an encaustic discovered by a farmer while plowing in a field near Cortona. Other articles are "On the New System of Telegraphy to and from Moving trains, by the use of Electric Induction," by P. H. Vander Weyde, M. D. "A lecture on Matter, including Radient Matter," by Alex. E. Otterbridge, Jr., etc.

The ever seasonable Popular Science Monthly is at hand for September and presents its usual attractive bill of fare. "The Relations of Railway Managers and Employees," by Dr. W. T. Bernard, is the first paper, which is very pertinent in the light of recent events in the west. Among other papers are "The present Aspect of Medical Education," by Wm. G. Thompson, M. D.; "Insect Fertilization of Flowers" by the eminent German botanist, Dr. Behrens; "Origin of Man and the other Vertebrates" by Prof. Cope; "The Fauna of the Sea-shore," by Prof. Mosely; "How Spelling Damages the Mind," by F. A. Fernald; "Recent Progress in Biology" by Prof. Lankister; "The Primitive Ghost and his Relations," by James G. Frazer, etc. The "Popular Miscellany", is full of interesting matter.

The August number of Mind in Nature completes the first half year of this unique and entertaining magazine, and fully sustains its reputation. This number has the inaugural address of Dr. A. Reeves Jackson, President for the Western Society of Psychical research. A resume of Mrs. Sidwick's report on Haunted Houses. A paper by Mrs. U. N. Gestefield on Common Sense versus Medicine; some interesting and curious mesmeric experiences by H. M. Hugunin; the continuation of Bishop Coxe's articles—this time on Mischances. Brief papers by Rrof. J. D. Butler, A. N. Waterman, and Lilian Whiting. A poem on Secret Thoughts by Ella Wheeler-Wilcox, with the usual amount of editorial matter, reviews and selections.

The old and popular Van Nostrand's Engineering Magazine gives its subscribers an exceedingly readable number for September. "The Relative Value of Tidal and Upland Waters in Maintaining Rivers, Estuaries and Harbors," by W. R. Browne, M. A., M. Inst. C. E.; "A Sketch of Roman Building Construction," W. T. Oldreve; "Three Problems in River Physics," by Prof. J. B. Johnson (Wash. Univ., St Louis), are some of the papers.

The frontispiece of The Woman's Magazine for August is "Aurora" drinking from morning-glory cups. The idea is carried out in some verses on "The Flower that Named Itself." Part II. of Miss Francis E. Willard's "Story of the Pyramids," tells of climbing Cheop's Pyramid, the outlook from the top, and the "Singing of the Rock of Ages" in the empty tomb at its base. "The Closest Tie," a true story of life in lumbering regions presents a strong contrast of woman's work. Mrs. Emma P. Ewing discourses on "Coffee-Tea-Toast," This number closes the eighth volume.

Among the papers, in the American Naturalist for August, the following may be noted for special interest or excellence: "Notice of some Human Remains found near the City of Mexico" (Illustrated) by Mariono de la Barceno; two continued articles, "Evolution in the Negotiable Kingdom" (Illustrated) by Lester F. Ward and "The Relations of Mind and Matter," by Charles Morris; and "The Use of Copper by the Deleware Indians," by C. C. Abbott. Under "General Notes" an admirable record of the progress of science is presented each month, and it does not lose character in this number.

The August number of the American Meterological Journal, manifests the robust character of the knowledge this periodical is circulating. Meterologists are gaining ground in establishing their study as a true science, by means of which true prevision is possible. "A remarkable Hail Storm" by J. H. Stathem, and a "Seven Day Weather Period, with Cuts and Tables," by H. H. Clayton, are interesting and useful papers. The prediction of Mr. Clayton in this number as to August weather, has been fulfilled in this latitude with great fidelity.

Mr. Proctor's Magazine, Knowledge, for July is at hand, and it would be a surfeited reader, indeed, who could regard its table of contents without pleasure. It contains a very Salmagunda of matter, "from grave to gay, from lively to severe." Without being invidious, attention is called to the paper of William Curran (reprinted in the REVIEW this month) on "Life in Death;" "Illusions of the Sense" by R. A. Proctor; "Photography and Medical Jurisprudence," by W. Mathews, etc.

The Journal of Science, (English), for August is an extremely interesting number. Oswald Dawson contributes a very trenchant, but ill-natured criticism of Mr. Darwin's Origin of Species. The author of Scientific Materialism contributes a paper on "Relations Between Spiritualism and Sceience." Other noteworthy papers are: "On the Chemical Action of Light," and "On the Problematical organisms of Ancient seas."

Under the management of the Danas the American Journal of Science has suffered no deterioration from the standard set by the Sillimans. The August number contains several articles of more than ordinary interest. Prof. J. D. Dana treats of the "Origin of Coral Reefs and Islands;" C. M. Shepard discusses the "Meteorite of Fomatlan, Jalisco, Mexico;" T. C. Mendenhall describes a "Defferential Resistance Thermometer," etc.

American Microscopical science has an able ally in the American Monthly Microscopical Journal, which is frst becoming indispensible to Microscopists. The August number is well filled with useful papers in this science, among which may be mentioned "A Practical Method of finding the Optical centre of an Objective and its Focal Length" (Illustrated), "Cleaning Marine Mud," "Measurement of Blood Corpuscles," etc.

The American Antiquarian and Oriental Journal (Quarterly) for July presents several very interesting features. Among the papers are "Ruins at Copan and Palenque," by L. P. Grataeap (Illustrated) notes by the editor; "Ancient Works on Iowa," by Prof. Thomas and "Native American Symbolism" by the editor. The usual departments are well filled with attractive matter.

The August number of Literary Life being the first number of volume IV, contains the first part of Joaquin Miller's great poem, "The Sword of the South." This poem, written in and for the South, he prophesies, will shake the rafters of heaven. It is for a juster appreciation of the true situation of the Southerner.

The Kansas City Medical Index for August contains some papers of a timely interest to the medical profession, such as "Cancer" and "The Theropeutics of Cocaine."

Science (weekly) is always welcome and we try to show a proper appreciation of its excellence by dipping our beak into its columns occasionally, as we do this month.

The American Inventor for August comes full of interest and news from the Patent Office. It is astonishing how multitudious American inventors are growing.

The Canadian Science Monthly gives us some original work in "Notes on the Birds of Manitoba," and "The Home of the Pitcher Plant," in the July number.

The Household for August comes full of good things for the housewife and the family.

Other publications received are The Fountain, for August, the Telegraphic Journal and Electric Review (weekly) English; the New York Electrical Review (weekly): the Engineering and Mining Journal (weekly); the Age of Steel (weekly); the California Architect for August; the Gardener's Monthly and Horticulturist for August; the Journal of Mycology for August; The Chemical News (weekly); Scandinavia for August; The Electrician and Electrical Enquirer for August; the Iron Trade Review (weekly); The Sugar Beet for August; Le Lechuologiste (weekly;) LeMoniteur du Commerce, (weekly;) Monthly Weather Review for June; The Spokesman of the Carriage and Harness Industries for August; Plain Talk for August; The Mining Review, weekly; The Progressive Age and Water-Gas Journal, for July; the Manufacturers and Builder for August; the Missouri School Journal, (weekly;) the New England School Journal, the Boston Journal of Commerce, (weekly,) etc.

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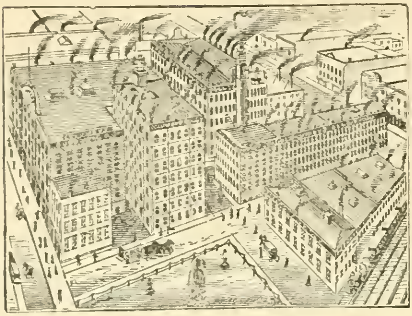

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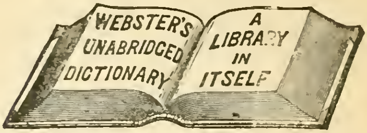

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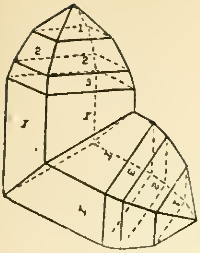

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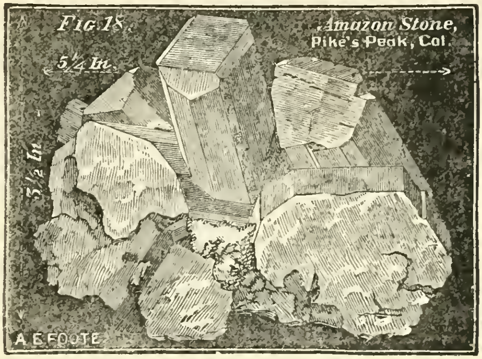

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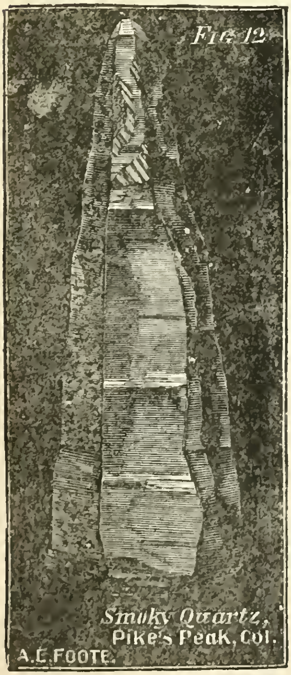

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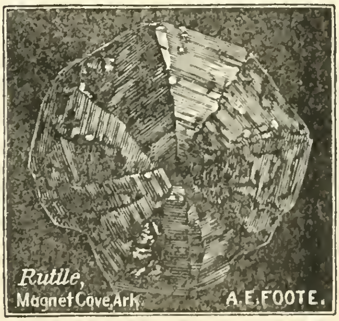

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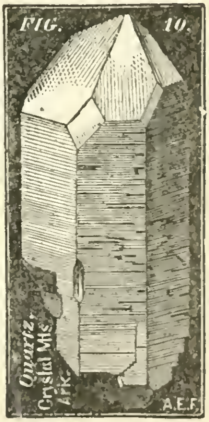

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